

# **INVERTER**

## **65PWB31**

### **DATA SHEET**

**DOD-PD-0734 (2nd edition)**



**This DATA SHEET is updated document from EN0560EJ1V0DS00.**

**All information is subject to change without notice.  
Please confirm the sales representative before starting to design your system.**

## INTRODUCTION

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While NEC has been making continuous effort to enhance the reliability of its products, the possibility of failures cannot be eliminated entirely. To minimize risks of damage to property or injury to person arising from a failure in an NEC product, customers must incorporate sufficient safety measures in their design, such as redundancy, fire-containment and anti-failure features.

NEC products are classified into the following three quality grades:

*"Standard", "Special", "Specific"*

The *"Specific"* quality grade applies only to applications developed based on a customer designated "quality assurance program" for a specific application. The recommended applications of a product depend on its quality grade, as indicated below. Customers must check the quality grade of each application before using it in a particular application.

**Standard:** Computers, office equipment, communications equipment, test and measurement equipment, audio and visual equipment, home electronic appliances, machine tools, personal electronic equipment and industrial robots

**Special:** Transportation equipment (automobiles, trains, ships, etc.), traffic control systems, anti-disaster systems, anti-crime systems, safety equipment and medical equipment (not specifically designed for life support)

**Specific:** Military systems, aircraft, aerospace equipment, submersible repeaters, nuclear reactor control systems, life support systems (medical equipment, etc.) and any other equipment

The quality grade of this product is *"Standard"* unless otherwise specified in this document. If customers intend to use this product for applications other than those specified for *"Standard"* quality grade, they should contact NEC sales representative in advance.

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**1. OUTLINE**



This 65PWB31 inverter is for LCD module. Adaptable LCD modules are as follows.

Adaptable LCD modules
NL6448BC20-08
NL6448BC20-08E
NL6448BC20-08F
NL6448BC20-14
NL6448BC26-01
NL6448BC26-03
NL10276BC12-02

**2. SPECIFICATION**

**2.1 GENERAL SPECIFICATIONS**

Item	Specification	Unit
Size	See "5.OUTLINE DRAWINGS".	mm
Weight	20 (max.)	g
Delivery unit	10 (min.)	set

**2.2 ABSOLUTE MAXIMUM RATINGS**



Parameter	Symbol	Rating	Unit	Remarks
Supply voltage	VDDB	6.0	V	Ta = 25°C
Storage temp.	Tst	-30 to +80	°C	-
Operating temp.	Top	-10 to +65	°C	-
Relative humidity Note1	RH	≤ 95	%	Ta ≤ 40°C
		≤ 85	%	40 < Ta ≤ 50°C
Absolute humidity Note1	AH	≤ 78 Note2	g/m <sup>3</sup>	Ta > 50°C

Note1: No condensation

Note2: Water amount at Ta=50°C and RH=85%

2.3 ELECTRICAL CHARACTERISTICS



(Ta=25°C)

Parameter		Symbol	min.	typ.	max.	Unit	Remarks
Power supply voltage		VDDB	4.75	5.0	5.25	V	Note1, Note2
Power supply current		IDDB	-	900	1,000	mA	VDDB = 5.0V Note2 (at the maximum luminance control)
Output voltage	Open lamp voltage	VO	900	-	-	Vrms	Ta = - 10 to + 65°C
	Lamp voltage (at steady state)	VBLH	-	375	-	Vrms	-
Output current	Lamp current (per lamp)	IBL	-	5.0	-	mArms	-
Oscillation frequency		FO	51	55	59	kHz	-
Luminance control frequency		FB	250	270	290	Hz	

Note1: When designing of the power supply, take the measures for the prevention of surge voltage.

Note2: The power supply lines (VDDB and GNDB) occurs large ripple voltage while luminance control of LCD lamps. There is the possibility that the ripple voltage produces acoustic noise and signal wave noise in audio circuit and so on. Put a capacitor (5,000 to 6,000 $\mu$ F) between the power source lines (VDDB and GNDB) to reduce the noise, if the noise occurred in the circuit.

2.4 FUSE

Parameter	Fuse		Rating	Fusing current	Remarks
	Type	Supplier			
VDDB	11CT2A	SOC Corporation	2.0A	4.0A	Note1
			72V		



Note1: The power supply capacity should be more than the fusing current. If the power capacity is less than the fusing current, the fuse may not blow for a short time, and then nasty smell, smoking and so on may occur.

2.5 CONNECTIONS AND FUNCTIONS FOR INTERFACE PINS



CN1 socket (Inverter side): IL-Z-6PL-SMTYE (Japan Aviation Electronics Industry Limited (JAE))  
 Adaptable plug: IL-Z-6S-S125C3 (Japan Aviation Electronics Industry Limited (JAE))

Pin No.	Symbol	Function	Remarks	
1	GNDB	Ground	Note1	
2	GNDB			
3	VDDB	Power supply		
4	VDDB			
5	BRTL	Luminance control input		See "2.6 Luminance control".
6	BRTH	Luminance control input		See "2.6 Luminance control". This pin is pulled-up to the internal reference voltage (2.46V) in the product. (Pull-up resistance: 5.6kΩ)

Note1: All GNDB and VDDB terminals should be used without any non-connected lines.

CN2 and CN3 socket (Inverter side): SM02(8.0)B-BHS-1-TB(LF)(SN)  
 (J.S.T Trading Company Ltd. (JST))



Adaptable plug: BHR-03VS-1 (J.S.T Trading Company Ltd. (JST))

Pin No.	Symbol	Function	Remarks
1	VBLH	High voltage (Hot)	-
2	N.C.	-	Keep this terminal Open.
3	VBLC	Low voltage (Cold)	-

Note1: VBLH and VBLC must be connected correctly. If customer connects wrongly, customer will be hurt and the module will be broken.

2.6 LUMINANCE CONTROL



Method	Adjustment and luminance ratio																										
Resistor control	<ul style="list-style-type: none"> <li>• Adjustment</li> </ul> <p>The variable resistor (<b>R</b>) for luminance control should be 10kΩ ±5%, B curve, 1/10W. Minimum point of the resistor is the minimum luminance. Also maximum point of the resistor is the maximum luminance.</p> <ul style="list-style-type: none"> <li>• Luminance ratio</li> </ul> <table border="1"> <thead> <tr> <th>Resistance</th> <th>Luminance ratio</th> </tr> </thead> <tbody> <tr> <td>0 Ω</td> <td>30% (min.) Note1</td> </tr> <tr> <td>10 kΩ</td> <td>100% (max.)</td> </tr> </tbody> </table>	Resistance	Luminance ratio	0 Ω	30% (min.) Note1	10 kΩ	100% (max.)																				
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Voltage control	<ul style="list-style-type: none"> <li>• Adjustment</li> </ul> <p>Voltage control method works, when BRTL terminal is 0V and BRTH voltage is input between BRTL and BRTH terminal. This control method can carry out continuation adjustment of luminance. Luminance is maximum when BRTH terminal is Open. Less than 0.5V causes backlight off.</p> <table border="1"> <thead> <tr> <th colspan="4">Except NL6448AC20-06</th> </tr> <tr> <th colspan="4">Between the terminals of BRTL and BRTH</th> </tr> </thead> <tbody> <tr> <td colspan="2">Less than 0.5V</td> <td colspan="2">Backlight off</td> </tr> <tr> <td colspan="2">0.5V to 1.5V</td> <td colspan="2">Unstable operations such as flicker may occur.</td> </tr> <tr> <td rowspan="2">Luminance control range</td> <td>1.5V</td> <td rowspan="2">Luminance ratio</td> <td>30% (min.) Note1</td> </tr> <tr> <td>2.3V</td> <td>100% (max.)</td> </tr> <tr> <td colspan="2">More than 2.5V</td> <td colspan="2">Don't use. IC will be damaged.</td> </tr> </tbody> </table>	Except NL6448AC20-06				Between the terminals of BRTL and BRTH				Less than 0.5V		Backlight off		0.5V to 1.5V		Unstable operations such as flicker may occur.		Luminance control range	1.5V	Luminance ratio	30% (min.) Note1	2.3V	100% (max.)	More than 2.5V		Don't use. IC will be damaged.	
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Note1: These data are the target values.


3. RELIABILITY TEST


This test is in accordance with the adaptable LCD module. Refer to Reliability Test of the LCD module.


4. PRECAUTIONS

4.1 MEANING OF CAUTION SIGNS


The following caution signs have very important meaning. **Be sure to read "4.2 CAUTIONS" and "4.3 ATTENTIONS", after understanding these contents!**


	This sign has the meaning that customer will be injured by himself or the product will sustain a damage, if customer has wrong operations.
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	This sign has the meaning that customer will get an electrical shock, if customer has wrong operations.
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	This sign has the meaning that customer will be injured by himself, if customer has wrong operations.
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4.2 CAUTIONS

	<ul style="list-style-type: none"> <li>* <b>Do not touch the inverter while the inverter is working, because there is a danger that customer will get an electric shock.</b></li> <li>* <b>Do not remove the inverter protection sheet, because there is a danger that customer will get an electrical shock.</b></li> <li>* <b>Be sure to wait some time after turning power OFF before starting replacement work, because the inverter is charged at a high voltage after working.</b></li> </ul>
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	<ul style="list-style-type: none"> <li>* <b>Be sure to wait some time after turning power OFF before starting replacement work, because the inverter is hot after working.</b></li> <li>* <b>Do not shock the inverter, because there is a danger of breaking.</b></li> </ul>
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4.3 ATTENTIONS



4.3.1 Handling of the product

- ① Take hold of both ends without touch the mounting parts when customer pulls out products from packing box. If customer touches it, products may be broken down or out of adjustment, because of stress to mounting parts.
- ② Take the measures of electrostatic discharge such as earth band, ionic shower and so on, when customer deals with the product, because products may be damaged by electrostatic.
- ③ Do not push-pull the interface connectors while the product is working, because wrong power sequence may break down the product.
- ④ Do not hook cables nor pull connection cables such as lamp cable and so on, for fear of damage.
- ⑤ Properly connect the adaptable plug (backlight side) to socket (inverter side) without incomplete connection. After connecting, be careful not to hook the lamp cables because incomplete connection may occur by hooking the lamp cables. This incomplete connection may cause abnormal operation of high voltage circuit.

☆



4.3.2 Environment

- ① Do not operate or store in high temperature, high humidity, dewdrop atmosphere or corrosive gases. Keep the product in antistatic pouch in room temperature, because of avoidance for dusts and sunlight, if customer stores the product.
- ② In order to prevent dew condensation occurring by temperature difference, the product packing box should be opened after leave under the environment of an unpacking room temperature enough. Because a situation of dew condensation occurring is changed by the environmental temperature and humidity, evaluate the leaving time sufficiently. (Recommendation leaving time: 6 hour or more with packing state) ☆
- ③ Do not operate in high magnetic field. Product may be broken down by it. ☆
- ④ This product is not designed as radiation hardened.

4.3.3 Other

- ① All GNDB and VDDB terminals should be used without any non-connected lines.
- ② Do not disassemble a product without permission of NEC.
- ③ Pack the product with original shipping package, because of avoidance of some damages during transportation, when customer returns it to NEC.
- ④ Put the spacer of 1.0mm thickness or more on a product rear side, because of the protection for contortion.
  - e.g., Washer condition: The washer thickness = 1.0mm (min.)
  - The washer diameter ( $\phi$ ) = 5.0mm (Recommendation)

