

MESSRS :

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## Product Drawing

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CUSTOMER'S PRODUCT NAME:

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TDK PRODUCT NAME:      DC/AC INVERTER UNIT CXA- 0538-A

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**\*Notice**

Product Drawing is not contract. This is only technical data.

This technical data may change internal description without any notice.

When you design final product please request us specification through our sales or distributors.

After you receive the specification, the contract is effective on signature of the specification.



**TDK-Lambda Corporation**

| PREPARED BY                              | APPROVED BY                              | AUTHORIZED BY                             |
|------------------------------------------|------------------------------------------|-------------------------------------------|
| <i>March 23, 2010</i><br><i>N.Suzuki</i> | <i>March 23, 2010</i><br><i>Y.Kimura</i> | <i>March 23, 2010</i><br><i>H.Masuoka</i> |

DWG.No.

CTR-3730-A

## Precautionary Notes Regarding the Use of This Inverter

**When using this product, give due consideration to the precautionary notes described below and ensure a safe design. Inappropriate use may result in electric shock, injury or fire.**



### Warning



- This product is subject to high voltage. Do not touch it while the power is on.  
Failing to do so may result in electric shock.



### Caution

- This product is designed for lighting Cold Cathode Fluorescent Lamps.  
Do not use it with any other load.
- Store this product under the conditions defined in the specification document.
- Do not store this product in an environment where dust, dirt or corrosive gas(salt,acid,base, etc.) is present.
- This product is subject to high voltage. If there is a possibility that the user may touch the product, provide a proper warning indication in order to draw the user's attention.
- This product is designed for use with general electronic equipment.  
If it is to be used with medical equipment that directly affects human life or for the control of transportation equipment to which passengers entrust their lives, provide thorough fail-safe measures.
- Consult us before using if this product is to be installed in a habitual vibration environment (vehicle, etc.).
- Avoid using this product under high temperatures or high humidity or in an environment in which dust, dirt or any corrosive gas (salt,acid,base, etc.) is present.  
Also,be careful not to allow the formation of dew condensation. It may result in damage or electric shock.
- If the product does not have a built-in protective circuit (circuit breaker, fuse, etc.), it is recommended that a fuse be used at the input stage to prevent the generation of smoke or fire in the event of a malfunction.  
Even when the product has a built-in protective circuit (circuit breaker, fuse, etc.), the circuit may not function properly due to inappropriate operating conditions or power-supply capacity. It is recommended that an appropriate protective circuit (circuit breaker, fuse, etc.) be provided separately from the built-in circuit.
- Use the product only within the specified input voltage, output power, output voltage and operating temperature ranges. Exceeding these values may result in damage, etc.
- Provide a measure for the prevention of surge voltage due to lightning, etc.  
Abnormal voltage may result in damage, etc.
- To prevent problems from occurring as a result of a short circuit in the high voltage section, be sure to take appropriate measures to prevent the entry of foreign substances into the inverter after it is installed.
- This product is not designed to provide resistance to radiation.
- In order to protect the inverter from vibration and shock, be sure to use all the mounting holes when installing the inverter.
- Ripples could be superimposed on the voltage and the current in the input source connected to the inverter , depending on the impedance in the input source, wiring, etc.  
When you select an input source, please check waveforms, etc on the final set.
- Please use all the mounting holes, because to defend the converter from vibration and impact.

### Handling Precautions

- This product uses thin wires. Observe the following precautions and handle it with care so as not to cause wire breakage. Broken wire may result in damage, etc.
  - ❖ Do not stack multiple products on top of one another.
  - ❖ Do not allow the product to come in contact with tools, etc.
- Do not apply excessive stress during installation.  
It may cause chipping and cracking,resulting in damage, etc.
- Provide clearance between the high-voltage section of this product and the frame body on which the product is installed and also the conductor section as on page 2 , [1] "Outline" .
- Do not use the product after it has been dropped because there is the possibility that components have been damaged.

|            | No.                            | MATERIALS NAME | QU          | MATERIAL | REMARK |
|------------|--------------------------------|----------------|-------------|----------|--------|
|            | PRODUCT NAME or MODEL,TITLE    |                |             |          |        |
|            | DC-AC INVERTER UNIT CXA-0538-A |                |             |          |        |
|            |                                |                |             |          |        |
| TDK-Lambda | NAME OF DRAWING                |                | DRAWING No. |          | PAGE   |
|            | Product Drawing                |                | CTR-3730-A  |          | 1      |

1. Product Name

The product name is DC-AC Inverter unit CXA-0538-A.

2. Contents

| Item                                  | Attached view | Page |
|---------------------------------------|---------------|------|
| 1.Appearance,Structure and Dimensions |               |      |
| Outline                               | refer to [1]  | 3    |
| Pin configuration                     | refer to [1]  | 4    |
| 2.Characteristics                     |               |      |
| Absolute Maximum Ratings              | refer to [2]  | 5    |
| 3.Electrical Characteristics          | refer to [3]  | 5    |
| 4.Test circuit                        | refer to [4]  | 6    |
| 5.Reliability Test                    | refer to [5]  | 7    |
| 6.Packing and Marking                 | refer to [6]  | 8    |
| 7.Others                              |               |      |
| Test Cond<br>Std Warranty<br>Others   | refer to [7]  | 8    |

|            | No.                            | MATERIALS NAME | QU | MATERIAL    | REMARK |
|------------|--------------------------------|----------------|----|-------------|--------|
|            | PRODUCT NAME or MODEL,TITLE    |                |    |             |        |
|            | DC-AC INVERTER UNIT CXA-0538-A |                |    |             |        |
|            |                                |                |    |             |        |
| TDK-Lambda | NAME OF DRAWING                |                |    | DRAWING No. | PAGE   |
|            | Product Drawing                |                |    | CTR-3730-A  | 2      |

● Features ●

· This inverter is for Four lamps. It has Dimming function(PWM System) and Remote function.

· This product has shutdown function.

It prevents from keeping generating the high voltage when the lamps open.(Refer Note.4-3.)

· With lamp failure detector.

Normal Operation : CN1-6=0V

Some Lamps Open : CN1-6=5V

· This product adjusts the output current for the leakage current.

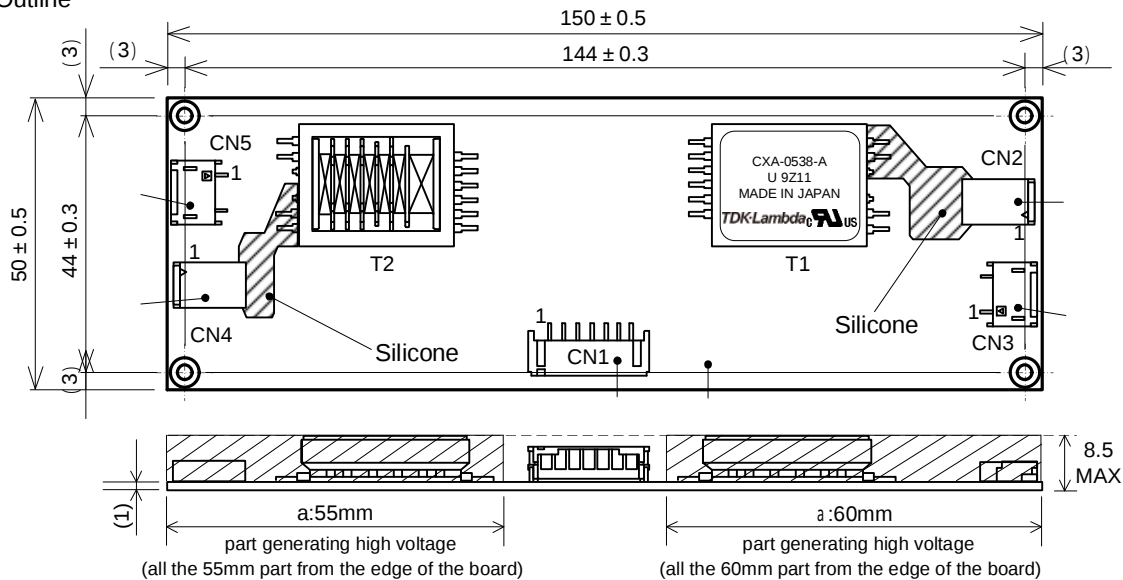
· The high-voltage area (terminals and patterns) is coated with silicone so as to avoid the defects caused by dust.

· This product is conformity to RoHS directive.( )

( ) Conformity to RoHS Directive: This means that, in conformity with EU Directive 2002/95/EC, lead, cadmium, hexavalent chromium, and specific bromine-based flame retardants, PBB and PBDE, have not been used, except for exempted applications.

[1] Outline

1-1. Outline



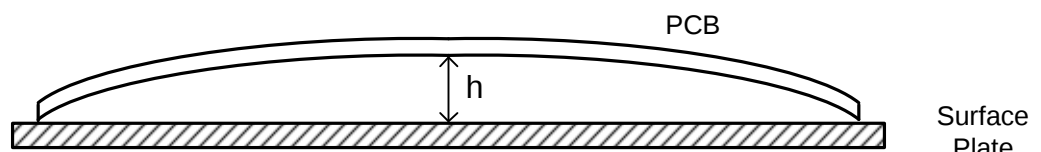
Unit : mm

Weight : 46.2g typ.

The dimensional deviation not instructed is assumed to be ± 0.3mm

| No. | Part Description         | Material                     | Qu | Remark        | Mates With  |
|-----|--------------------------|------------------------------|----|---------------|-------------|
|     | PCB                      | Composite (CEM-3)            | 1  | UL94V-0 t=1.0 | -           |
|     | Input Connector CN1      | S7B-PH-SM4-TB(LF)(SN)        | 1  | JST           | PHR-7       |
|     | Output Connector CN2,CN4 | SM02B-BHSS-1-TB(LF)(SN)      | 2  | JST           | BHSR-02VS-1 |
|     | Output Connector CN3,CN5 | SM02(4.0)B-BHS-1-TB(LF) (SN) | 2  | JST           | BHR-02VS-1  |

The warp of the substrate is 2mm or less. (h)



| No.                            | MATERIALS NAME | QU          | MATERIAL | REMARK |
|--------------------------------|----------------|-------------|----------|--------|
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| DC-AC INVERTER UNIT CXA-0538-A |                |             |          |        |
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TDK-Lambda

<The specifications may be changed without any notice.>

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## 1-2. Connector Configuration

### Input side

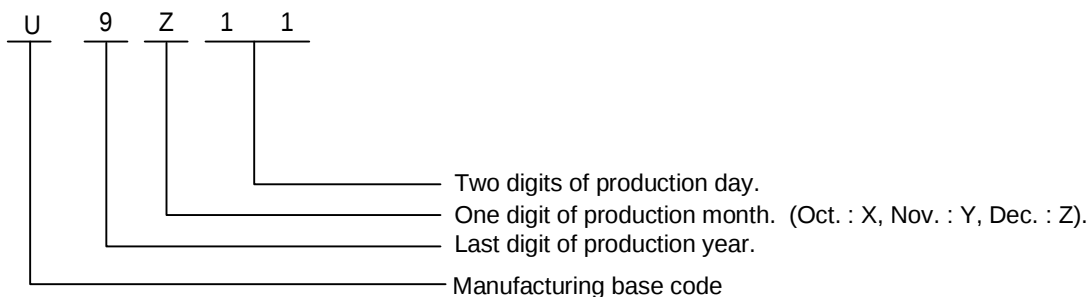
| Pin No.            | Symbols | Ratings              | Notes                                                 |
|--------------------|---------|----------------------|-------------------------------------------------------|
| CN1-1              | Vin     | 10.8 ~ 13.2V         | Input Voltage                                         |
| CN1-2              |         |                      |                                                       |
| CN1-3              | GND     | 0V                   | GND                                                   |
| CN1-4              |         |                      |                                                       |
| CN1-5              | Vbr/Rbr | 0 ~ 1.9V<br>0 ~ 20kΩ | Control/VR                                            |
| CN1-6<br>(OUT PUT) | Vst     | 0V/5V                | The warning output<br>5V in abnormal<br>circumstances |
| CN1-7              | Vrmt    | 0V/2.5V ~ Vin        | 0 ~ 0.4V:OFF<br>2.5 ~ Vin V:ON                        |

### Output side

| Pin No. | Symbols | Ratings   | Notes          |
|---------|---------|-----------|----------------|
| CN2-1   | VHIGH1  | (585Vrms) | Output1        |
| CN2-2   | VHIGH2  | (585Vrms) | Output2        |
| CN3-1   | VLOW1   | (3.8V)    | Output1 Return |
| CN3-2   | VLOW2   | (3.8V)    | Output2 Return |
| CN4-1   | VHIGH3  | (585Vrms) | Output3        |
| CN4-2   | VHIGH4  | (585Vrms) | Output4        |
| CN5-1   | VLOW3   | (3.8V)    | Output3 Return |
| CN5-2   | VLOW4   | (3.8V)    | Output4 Return |

Note1-1. Marking of TDK part No, Date code, Country of origin.

- 1) TDK part No., Date code, Country of origin, TDK-Lambda Logo, is marked on the transformer.
- 2) Date code example. (ex. Dec.11. 2009)



- 3) Country of origin code example. (ex. MADE IN JAPAN. MADE IN CHINA,MADE IN MALAYSIA).

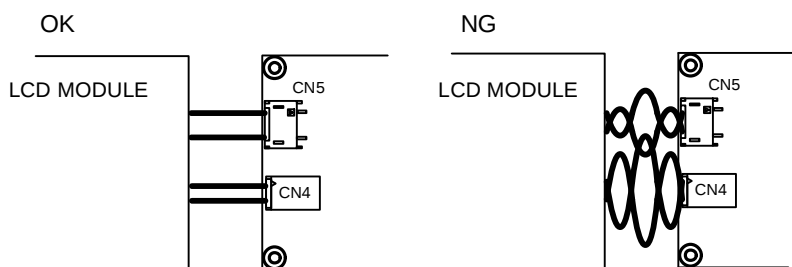
Note1-2. For circuit connection, please prefer to test circuit diagram [4].

Note1-3. Please use minimum of 3mm clearance (all directions) between inverter high voltage area and any conductors. Please refer to mechanical drawing for marking of high voltage area.

Note1-4. Open voltage (strike voltage) is measured across the transformer secondary winding at no load as the reading at the output connector would be less than the actual value.

Note1-5. If the start up voltage falls below Cold Cathode Tube strike voltage, the CCFL will not light up easily specially at lower ambient temperature. Please review mounting instruction to avoid any abnormal operation due to coupling/leakage capacitance of inverter high voltage area to any surrounding conductor.

Fig1.High Voltage Code



| No.                            | MATERIALS NAME  | QU | MATERIAL    | REMARK |
|--------------------------------|-----------------|----|-------------|--------|
| PRODUCT NAME or MODEL,TITLE    |                 |    |             |        |
| DC-AC INVERTER UNIT CXA-0538-A |                 |    |             |        |
| TDK-Lambda                     | NAME OF DRAWING |    | DRAWING No. | PAGE   |
|                                | Product Drawing |    | CTR-3730-A  | 4      |

- Note1-6. Please check your lamp characteristic for minimum operational current and set the limit point in your design to avoid flickering and/or abnormal operation.
- Note1-7. For proper operation of circuit protection (fuse or IC PROTECTOR), Please use minimum of 6.3A capacity for input power supply.
- Note1-8. Impedence from the wire connection can cause a ripple in the input. The product has an internal fuse of 3.15A. Please check that input current peak wave form does not exceed 3.15A.
- Note1-9. The cable of hight voltage must not come in contact with a metallic frame.

[2] Absolute maximum ratings

| Items                 | Symbols          | Specification | Unit   | Notes                                             |
|-----------------------|------------------|---------------|--------|---------------------------------------------------|
| Input Voltage         | Vin              | 0 ~ 15        | VDC    |                                                   |
|                       | Vrmt             | 0 ~ Vin       |        |                                                   |
|                       | Vbr              | 0 ~ 16        |        |                                                   |
| Load Resistance       | RL1 ~ 4//CL1 ~ 4 | 100//6        | kΩ//pF |                                                   |
| Operating Temp. range | Ta               | -30 ~ 80      |        |                                                   |
| Storage Temp. range   | Ts               | -30 ~ 85      |        |                                                   |
| Humidity range        | RH               | 95            | %RH    | A maximum wet ball temperature is 38°C<br>No dew. |

[3] Electrical specifications

| Item                     | Symbol    | Conditions |          |                     |                        |                               | Specifications |      |      | Unit  |
|--------------------------|-----------|------------|----------|---------------------|------------------------|-------------------------------|----------------|------|------|-------|
|                          |           | Vin(V)     | Vrmt(V)  | Vbr(V) /<br>Rbr(kΩ) | Ta( )                  | RL1 ~ 4(kΩ)<br>// CL1 ~ 4(pF) | MIN.           | TYP. | MAX. |       |
| Output Current (max.)    | lout1 ~ 4 | 12 ± 1.2   | 5 ± 0.25 | 0 / 0               | -20 ~ 70               | 90 // 6                       | 6.0            | 6.5  | 7.0  | mArms |
| Output Current (min.)    | lout1 ~ 4 |            |          | 1.9 / 20            | -30 ~ 80               |                               | 3.5            | 4.2  | 4.9  |       |
| Output Current (max.)    | lout1 ~ 4 |            |          | 0 / 0               |                        |                               | 5.9            | 6.5  | 7.1  |       |
| Input Current1           | lin1      |            |          | 0 / 0               |                        |                               | -              | 1.7  | 2.5  | A     |
| Input Current2           | lin2      |            | 0        | 0 ~ 1.9 / 0 ~ 20    | -                      |                               | -              | 1    | mA   |       |
| Frequency                | F1        |            | 5 ± 0.25 | 0 / 0               | 45                     |                               | 50             | 55   | kHz  |       |
| Frequency (duty)         | F2        |            |          | 1.9 / 2.0           | 125                    |                               | 155            | 185  | Hz   |       |
| Open Circuit Voltage     | Vopen     |            |          | 0 / 0               | ∞<br>∞                 |                               | 1.7            | 2.0  | 2.3  | kVrms |
| Warning Signal (Note4-3) | Vst       |            |          | 0 ~ 1.9 / 0 ~ 20    | 90 // 6<br>(Note4-3) 1 | 4.5                           | 5.0            | 5.5  | V    |       |
|                          |           |            |          | 0 ~ 1.9 / 0 ~ 20    | 90 // 6                | -                             | 0              | 0.5  |      |       |

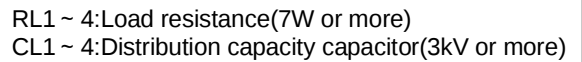
| No.                            | MATERIALS NAME | QU | MATERIAL    | REMARK |
|--------------------------------|----------------|----|-------------|--------|
| PRODUCT NAME or MODEL,TITLE    |                |    |             |        |
| DC-AC INVERTER UNIT CXA-0538-A |                |    |             |        |
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TDK-Lambda

<The specifications may be changed without any notice.>

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#### [4] Test circuit



Note.4-1.SW1(ON/OFF) Operation is as following;

|      |                   |
|------|-------------------|
| SW1  | Operation of unit |
| a    | Operation         |
| b    | Non operation     |
| Open | Non operation     |

Note.4-2.SW2(ON/OFF) Operation is as following;

|     |                                           |
|-----|-------------------------------------------|
| SW2 | Operation of unit                         |
| a   | *Voltage dimming<br>Vbr=0~1.9V            |
| b   | *Variable resistance dimming<br>VR=0~20kΩ |

### Note4-3.Safety Function

| Conditions                | Alarm Signal Function<br>(CN1-6) <sup>1</sup> | Shutdown<br>Function <sup>2</sup> |
|---------------------------|-----------------------------------------------|-----------------------------------|
| Normality                 | 0.5V max.                                     | No shutdown<br>(Operation)        |
| Load (Lamp)<br>one open   | 4.5 ~ 5.5V                                    | Shutdown                          |
| Load (Lamp)<br>Two open   | 4.5 ~ 5.5V                                    | Shutdown                          |
| Load (Lamp)<br>Three open | 4.5 ~ 5.5V                                    | Shutdown                          |
| Load (Lamp)<br>Four open  | 4.5 ~ 5.5V                                    | Shutdown                          |

#### Note4-4.Safety Function

- (V) Digital Multiple Meter(ADVA NTEST R6451A or equivalent)
  - (A) DC Current Meter(ADVANTEST R6451A or equivalent)
  - (F) Frequency Countor(ADVANTE ST R6452A or equivalent)
  - (V) True RMS Meter(KEITHLEY 2001 or equivalent.)
  - (A) High Frequency Current Meter(KEITHLEY 2001 or equivalent)
- 00:1 High Voltage Probe (Tektronix P3000 or equivalent)

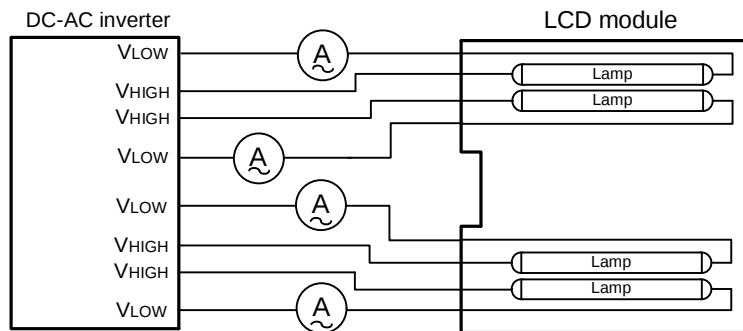
1. When any of the load is opened, the alarm output becomes 5V.

- 2.If the inverter detects open output connector for about 3 seconds it will shut down.

Input current 3 is an input current after operation stops.

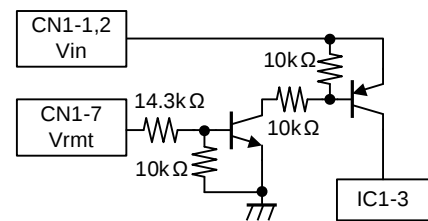
|                                |                |             |          |        |
|--------------------------------|----------------|-------------|----------|--------|
| No.                            | MATERIALS NAME | QU          | MATERIAL | REMARK |
| PRODUCT NAME or MODEL,TITLE    |                |             |          |        |
| DC-AC INVERTER UNIT CXA-0538-A |                |             |          |        |
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LCD module Connected chart (reference)



Connect the High Frequency Current Meter to the Low-Voltage (VLOW) side.

Vrmt terminal circuit (Reference)



[5] Reliability test

Following test items are assured.

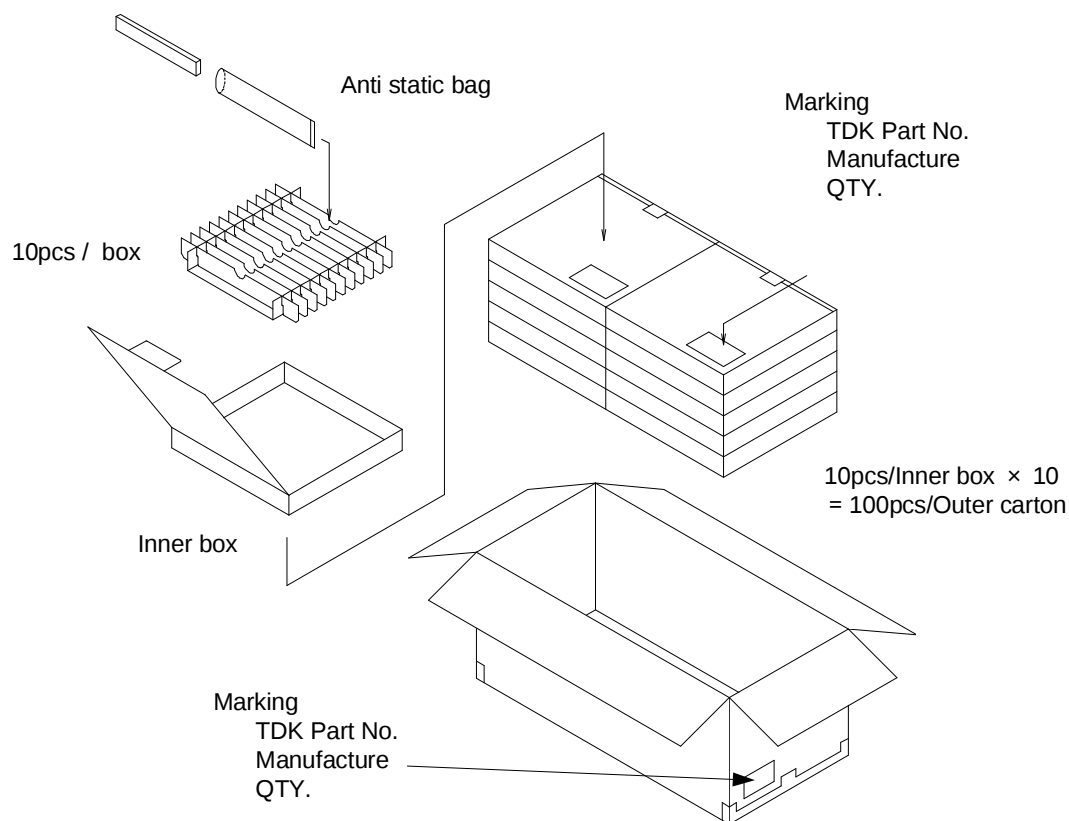
| Items                         | Conditions                                                                                                              | Judgement                                       |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|
| Low Temp.<br>Non operational  | -30°C 500h                                                                                                              | Electrical and apperance should be in the spec. |
| Low Temp.operational          | -30°C 500h<br>Load cond.:TYP                                                                                            |                                                 |
| High Temp.<br>Non operational | 85°C 500h                                                                                                               |                                                 |
| High Temp.operational         | 80°C 500h<br>Load cond.:TYP                                                                                             |                                                 |
| Heat shock                    | -30°C to 80°C<br>30min.Each 100 Cycles                                                                                  |                                                 |
| Humidity<br>(Non operational) | 60°C 90~95%RH 500h                                                                                                      |                                                 |
| Vibration                     | 10~57Hz Amplitude 0.75mm or 9.8m/s <sup>2</sup><br>58~500Hz 9.8m/s <sup>2</sup><br>Sweep:11min<br>60min each axis X,Y,Z |                                                 |
| Shock                         | 980m/s <sup>2</sup> 11ms<br>Harf-sine pulse<br>1 time each axis ±X,Y,Z                                                  |                                                 |

| TDK-Lambda | No.                            | MATERIALS NAME | QU          | MATERIAL | REMARK |
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|            | NAME OF DRAWING                |                | DRAWING No. |          | PAGE   |
|            | Product Drawing                |                | CTR-3730-A  |          | 7      |

[6] Packing and Marking

A shipping box is packaged to avoid from water or damage. Following items are printed on the box.

- 6-1. TDK part No. CXA-0538-A
- 6-2. Manufacture
- 6-3. QTY.



[ 7] Others

- 7-1. Test conditions  
Unless otherwise specified, the temperature to be (25 ± 15) and humidity to be (65 ± 20) %RH.
- 7-2. Warranty  
Warranty shall be for one year after delivery, and those products causing failure during the warranty period and which failures are attributed to the manufacturer's responsibility shall be replaced at no charge.
- 7-3. Others  
When any doubt arises about this specification, it shall be discussed and decided upon between both parties. Shipment inspection result sheet are subject to change without notice.

| TDK-Lambda | No.                            | MATERIALS NAME | QU          | MATERIAL | REMARK |
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|            | DC-AC INVERTER UNIT CXA-0538-A |                |             |          |        |
|            | NAME OF DRAWING                |                | DRAWING No. |          | PAGE   |
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Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

**Телефон:** 8 (812) 309 58 32 (многоканальный)

**Факс:** 8 (812) 320-02-42

**Электронная почта:** [org@eplast1.ru](mailto:org@eplast1.ru)

**Адрес:** 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.