

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-0547

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**TENTATIVE**

**\*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>April 27th, 2010 K.Imai</i>	<i>April 27th, 2010 K.Yamaishi</i>	<i>April 27th, 2010 H.Masuoka</i>

DWG. No.

CTR-3829-C

## 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-0547				
<b>TDK-Lambda</b>	NAME OF DRAWING		DRAWING No.	PAGE
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1. Product Name

The product name is CXA-0547.

2. Contents

Item	Attached view	Page
1.Appearance, Structure and Dimension		
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]	8
6.Packaging and Marking	refer to [6]	9
7.Other	refer to [7]	9

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**\*If product drawing is different from product specification, product specification is prior.**

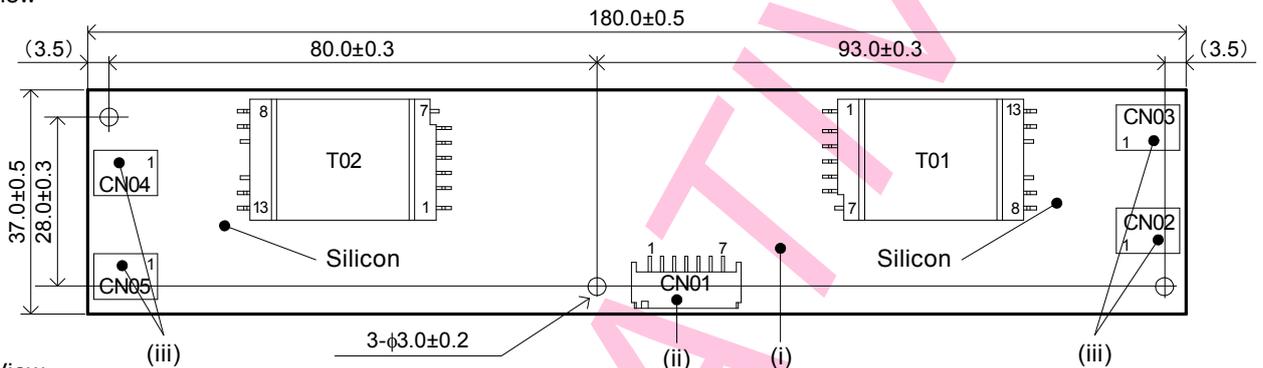
●Features●

- 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 all of the lamps open.(Refer Note.4-3.)  
Normal Operation : CN01-6=0V  
Any Lamps Open : CN01-6=5V
- 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.

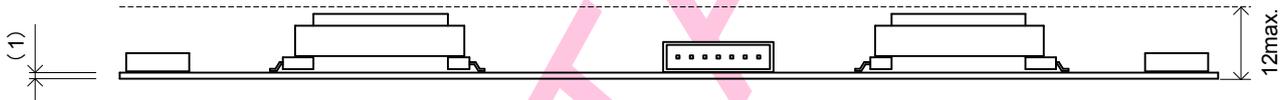
[1] Appearance, Structure and Dimension

1-1. Outline

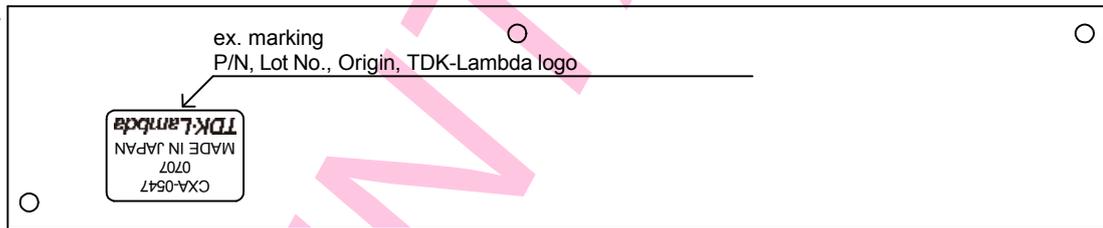
Top View



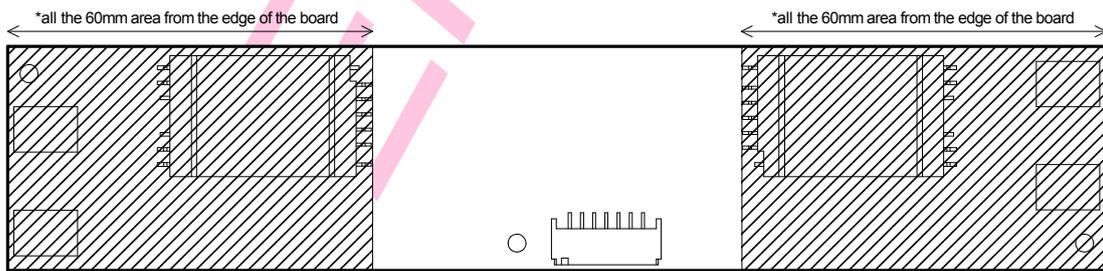
Side View



Bottom View



Unit:mm  
Mass:43g typ.



A area: Area generating high voltage

\*Please secure 4mm of longer space distance from the high voltage generating area in all directions. Please see Note1-3 for details.

No.	Parts Description	Product Name/Material	Qty.	Remark	Corresponding Connector
i	PCB	Composite (CEM-3)	1	UL94V-0 $\tau=1.0$	-
ii	Input Connector CN01	S7B-PH-SM4-TB(LF)(SN)	1	J.S.T. Mfg. Co.	PHR-7
iii	Output Connector CN02~05	SM02B-BHSS-1-TB(LF)(SN)	4	J.S.T. Mfg. Co.	BHSR-02VS-1

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**TDK-Lambda**

## 1-2. Pin Configuration

Input Side: CN01

Pin No.	Symbol	Ratings	Notes
CN01-1	Vin	10.8~13.2V	Input Voltage
CN01-2			
CN01-3	GND	0V	GND
CN01-4			
CN01-5	Vbr/Rbr	0~2.5V / 0~50kΩ	Dimming Control Voltage / Volume
CN01-6	Vst (Output)	0V / 5V	Warning Output abnormal: 5V steady: 0V
CN01-7	Vrmt	0~0.4V / 2.5V~Vin	Remote Control 0~0.4V:OFF 2.5V~Vin:ON

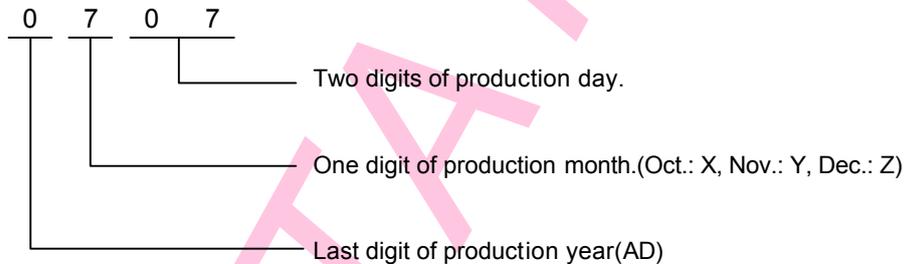
Output Side: CN02,03,04,05

Pin No.	Symbol	Ratings	Notes
CN02-1	VHIGH1	6.9mArms (550Vrms)	Output1
CN02-2	VLOW1	(7.5V)	Output1 Return
CN03-1	VHIGH2	6.6mArms (550Vrms)	Output2
CN03-2	VLOW2	(7.5V)	Output2 Return
CN04-1	VHIGH3	6.6mArms (550Vrms)	Output3
CN04-2	VLOW3	(7.5V)	Output3 Return
CN05-1	VHIGH4	6.6mArms (550Vrms)	Output4
CN05-2	VLOW4	(7.5V)	Output4 Return

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

1) TDK-Lambda part No., Lot No., Date code, Country of origin and TDK-Lambda logo is labelled on backside of PCB.

2) Date code example (ex. July 07th 2010)



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

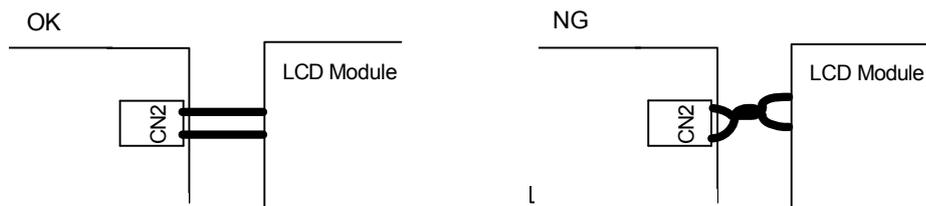
Note1-2. Please refer to test circuit diagram[4] for terminal connection.

Note1-3. Area "A" in the Appearance, Structures and dimension[1] generates high voltage. When you mount a conductive materials (metal frame etc.) nearby area "A" during installation, please be careful to secure 4mm or greater spatial distance in all directions around it to prevent electric discharge from the high-voltage area by the conductive materials.

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

Note1-5. The voltage applied to the load could be lower than the output open circuit voltage when the stray capacitance in a mounted condition is high (due to leakage of current by stray capacitance), and makes it particularly hard to light when driving a CCFL in low temperatures. Please be careful in your installation to make the stray capacitance as low as possible. (For example, make high voltage cable placing to a CCFL as short as possible, and never use standard cable for the high voltage line.)

fig.1: High Voltage Cable Placing



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Note1-6. Please check your lamp characteristics for minimum operational current and set the limit point in your design to avoid flickering and/or abnormal operation

Note1-7. Impedance from the wire connection can cause a ripple in the input. The product has an internal circuit protector of 3.15A. Please check that input current peak waveform does not exceed 3.15A.

Note1-8. For proper operation of circuit protection (fuse or IC protector), Please use minimum 6.3A capacity for input power supply.

[2] Absolute Maximum Ratings

Item	Symbol	Specification	Unit	Notes
Input Voltage	Vin	0~14.4	V	Vinmax is include ripple voltage. Never beyond Vinmax in any conditions.
	Vrmt	0~Vin		
	Vbr	0~Vin		
Load Resistance	RL	90	kΩ	
Operating Temperature Range	Ta	-20~+70	°C	
Storage Temperature Range	Ts	-30~+85	°C	
Humidity Range	R.H.	95	%RH	A maximum wet bulb temperature is 38°C No dew.

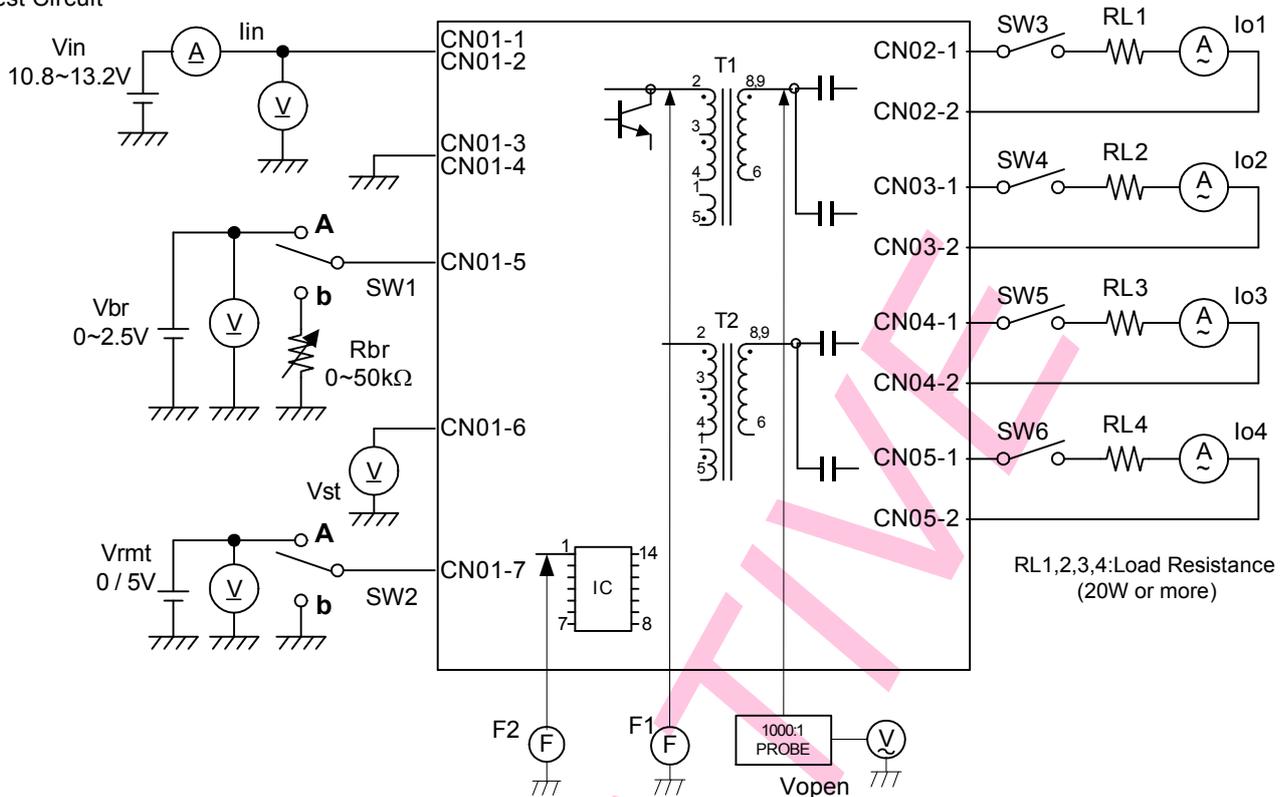
[3] Electrical Specifications

Item	Symbol	Condition					Specification			Unit
		Vin(V)	Vrmt(V)	Rbr(kΩ) / Vbr(V)	Ta(°C)	RL1,RL2,RL3,RL4 (kΩ)	MIN.	TYP.	MAX.	
Output Current (max. brightness)	Iout	12±1.2	5±0.25	0 / 0	-20~70	80	6.2	6.9	7.6	mArms
		12±0.05	5±0.25	0 / 0	23±5	80	6.4	6.9	7.4	
Output Current (min. brightness)		12±1.2	5±0.25	50 / 2.5	-20~70	80	1.7	2.7	3.7	
Input Current1	Iin1	12±1.2	5±0.25	0 / 0	-20~70	80	-	1.6	2.2	A
Input Current2	Iin2	12±1.2	0±0.25	0 / 0	-20~70	80	-	0	1	mA
Oscillation Frequency	F1	12±1.2	5±0.25	0 / 0	-20~70	80	40	45	50	kHz
PWM dimming Frequency	F2	12±1.2	5±0.25	50 / 2.5	-20~70	80	120	140	160	Hz
Open Circuit Voltage	Vopen	10.8±0.05	5±0.25	0 / 0	-20~70	∞	1800	2100	2400	Vrms
Warning Output (Note4-2)	Vst	12±1.2	5±0.25	0 / 0	-20~70	RL1=∞, RL2,RL3,RL4=80	4.5	5.1	5.5	V
		12±1.2	5±0.25	0 / 0	-20~70	RL2=∞, RL1,RL3,RL4=80	4.5	5.1	5.5	
		12±1.2	5±0.25	0 / 0	-20~70	RL3=∞, RL1,RL2,RL4=80	4.5	5.1	5.5	
		12±1.2	5±0.25	0 / 0	-20~70	RL4=∞, RL1,RL2,RL3=80	4.5	5.1	5.5	
		12±1.2	5±0.25	0 / 0	-20~70	80	-	0.1	0.5	

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[4] Test Circuit



\*Please refer to 1-1 Outline about pin assignment and location.

Note4-1. The unit behavior is following about SW1 and SW2.

SW1	Unit Behavior
A	* Voltage dimming Vbr=0~2.5V
b	*Volume dimming VR=0~50kΩ

SW2	Unit Behavior
A	Working
b	Not Working

\*Vbr=0V: Maxium Brightness, Rbr=0Ω: Minimum Brightness

Note4-2. Protection circuit behavior

Condition	Warning Signal (CN1-6) <sup>*1</sup>	Shutdown Function <sup>*2</sup>
Normality	0.5V max.	Working
One lamp open	4.75~5.25V	Working
Two lamps open	4.75~5.25V	Working
Three lamps open	4.75~5.25V	Working
All lamps open	4.75~5.25V	Shutdown

Note4-3. Test Instruments

- : Digital Multiple Meter (ADVANTEST R6452A or equivalent)
- : DC Current Meter (ADVANTEST R6452A or equivalent)
- : True RMS Meter (NF Circuit M2170 or equivalent)
- : Frequency Counter (ADVANTEST R6452A or equivalent)
- : High Frequency Current Meter (FLUKE 187 or equivalent)
- : High Voltage Probe (Tektronix P6015A or equivalent)

\*1. When any of the load is opened, the al arm output becomes 5V.

\*2. When all of the load is opened, inverter will shut down about 3 seconds.

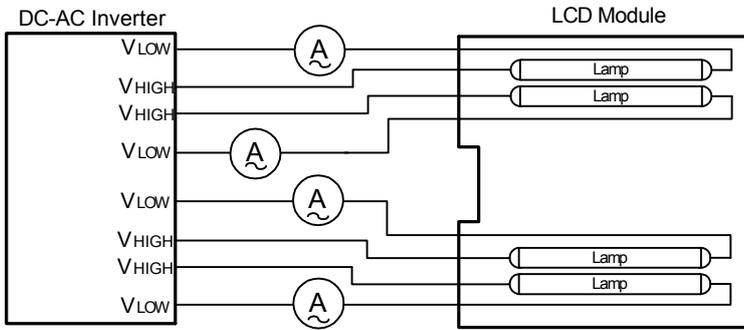
\*3. When the warning output is active, please stop the unit immediately.

Any problems have occurred on the load side when the alarm output becomes active.

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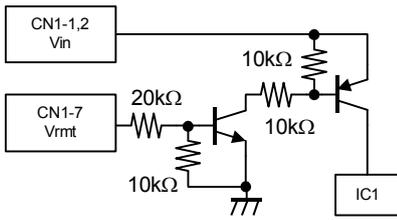
**TDK-Lambda**

LCD module connection diagram (reference)

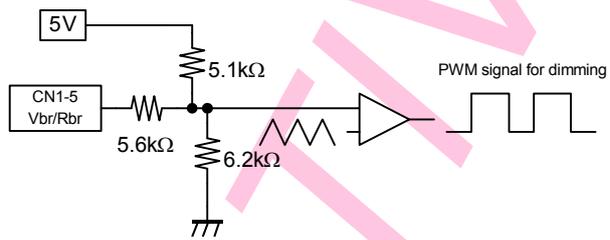


\*Connect the high frequency meter to the low voltage(Vlow) side.

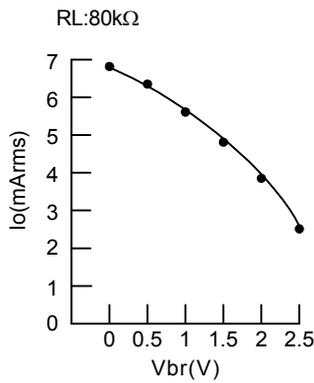
Vrmt terminal circuit (reference)



Vbr terminal circuit (reference)



Vbr vs Output Current (reference)



\*Please confirm at final set, because this value is reference.

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**TDK-Lambda**

[5] Reliability Test

The following reliability test items are guaranteed.

Item	Condition	Judgement Standard
Low Temperature Storage	-30°C 500hrs.	Electrical characteristics and appearance should be within the specification.
Low Temperature Operation	-20°C 500hrs. Input, Load Condition: Typ.	
High Temperature Storage	85°C 500hrs.	
High Temperature Operation	70°C 500hrs. Input, Load Condition: Typ.	
Heat Shock	-30°C↔85°C 30min./each 100cyc.	
Humidity Continuous Operation	40°C 90~95%R.H. 500hrs. Input, Load Condition: Typ.	
Vibration	10~500Hz Half Amplitude 0.75mm or 9.8m/s <sup>2</sup> Sweep time: 11min. 60min. X, Y, Z direction/ea. (total 3hrs.)	
Shock	980m/s <sup>2</sup> 11ms Half sine wave ±X, Y, Z direction/ea. (total 6times)	

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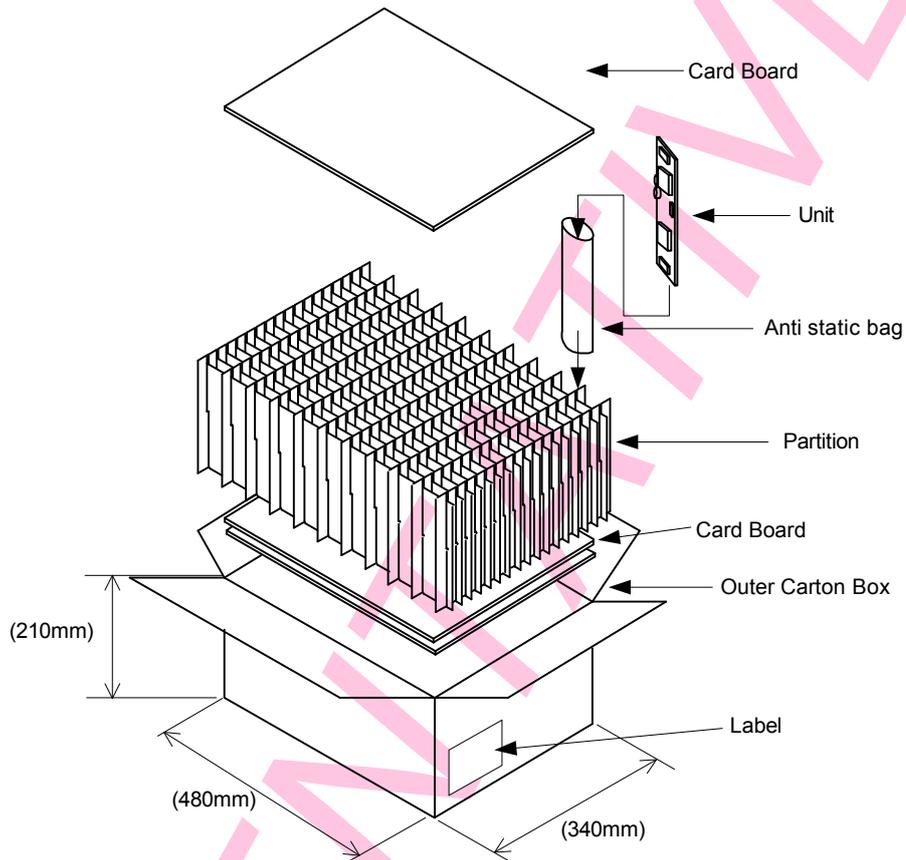
**TDK-Lambda**

[6] Packaging and Marking

The unit is packaged in order to prevent water ingress and damage, the following items are printed on the box.

- 6-1. Product Name CXA-0547
- 6-2. Manufacturer
- 6-3. Quantities

Packaging standard is following.160units in a box.



[7] Other

- 7-1. Test Condition  
Unless otherwise specified, the temperature standard is to be 15~35°C and humidity is to be 25~75%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. Other  
When any doubt arises about this specification, it shall be discussed and decided upon between both parties.

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