MESSRS :

Product Drawing

CUSTOMER'S PRODUCT NAME:

TDK PRODUCT NAME: DC/AC INVERTER UNIT
CXA-0453

TDK·Lambda

TDK Corporation

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DWG.No.	CTR-1924-B

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 the lighting of a Cold Cathode Fluorescent Lamp.
  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 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.
- 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 arising from short-circuiting of the high-voltage section,
  provide appropriate measures to prevent the entry of foreign substances following installation.
- This product is not designed to provide resistance to radiation.
- 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.

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 per listed on page 2 , [1] ”Outline” .
- Please do not use the product, when dropping it, since there is a possibility of the parts damage.
  Please confirm abnormality is not found in the product enough when using it by any chance.

1. Part Name

The part name is CXA-0453.

2. Contents

・ Listed description are subject to change without notice.

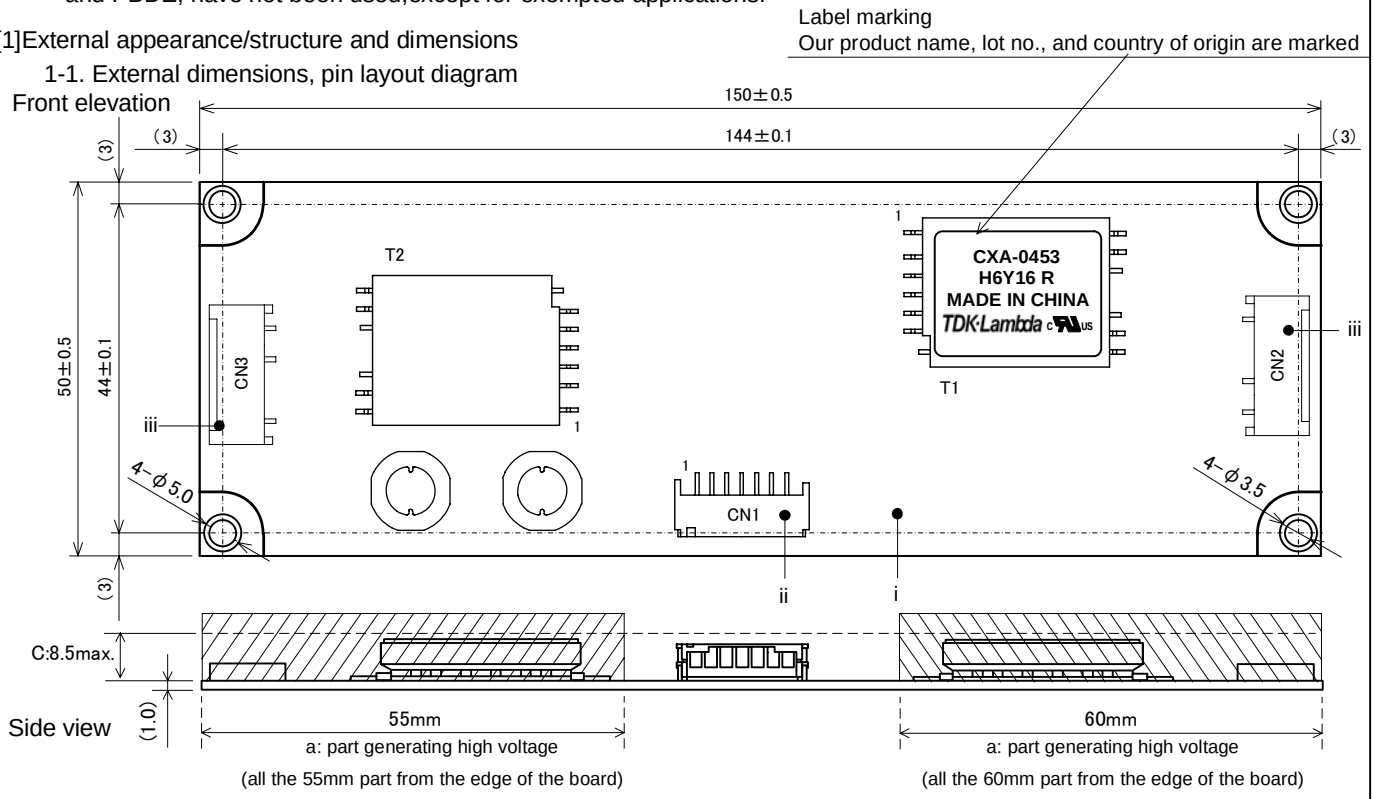
●Product Outline●

・ This product is a 4-lamp inverter and has dimming functions (PMW method) and remote functions.
・ his product has a shutdown function for safety to stop high voltage generation when all loads (lamps) are open. (Note 4-3)
・ This product has an alarm output (a lamp blowout detecting function) to inform load (lamp) abnormality when loads (lamps) are open. When loads (lamps) are connected normally, 0V is output on CN1-6, and when loads (lamps) are open, 5V is output on CN1-6.
・ High voltage generation on the inverter board is marked by a lighted LED. (Note 4-3)
・ he high voltage generating section is coated with silicone as a measure against 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.

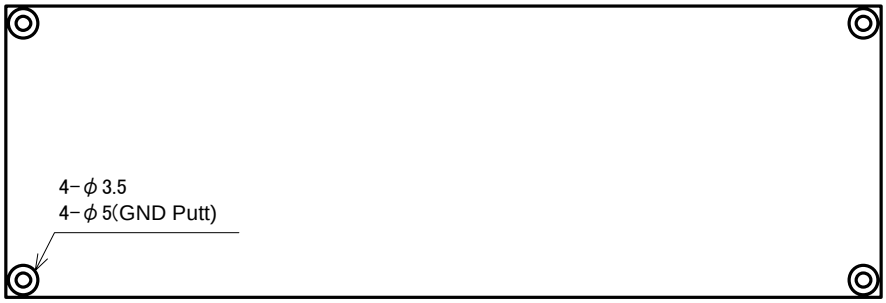
[1]External appearance/structure and dimensions

1-1. External dimensions, pin layout diagram



*Please secure the air clearance of 3mm or more from the high voltage generation area up and down and right and left. Please refer to Note1-3. for details.

Rear view



Dimensions in mm
Weight: 43.0g (Typ.)

No.	Product name	Type name / material	Quantity	Remarks
i	Printed wiring board PWB	Composite (CEM-3)	1	UL94V-0 t=1.0
ii	Input connector CN1	S7B-PH-SM4-TB	1	JST
iii	Output connector CN2,3	SM03(7-D1)B-BHS-1(LF)(SN)	2	JST

1-2. Pin connection

Input side

Pin No.	Symbol	Rating	Remarks
CN1-1	Vin	10.8 ~ 13.2V	Power input
CN1-2			
CN1-3	GND	0V	GND
CN1-4			
CN1-5	Vbr/Rbr	0 ~ 2.5V 0 ~ 50kΩ	Dimming control
CN1-6 (Output)	Vst	0V/5V	Alarm output 5V when lamps are open
CN1-7	Vrmt	0V/2.5V ~ Vin	Remort control 0 ~ 0.4V:OFF 2.5 ~ Vin V:ON

Output side

Pin No.	Symbol	Rating	Remarks
CN2-1	VHIGH1	540Vrms	Output 1
CN2-2	VHIGH2	540Vrms	Output 2
CN2-3	NC	---	---
CN2-4	VLOW1	(2V)	Return on output 1
CN3-1	VHIGH3	540Vrms	Output 3
CN3-2	VHIGH4	540Vrms	Output 4
CN3-3	NC	---	---
CN3-4	VLOW2	(2V)	Return on output 2

Note 1-1.Marking of product name, lot no., and country of origin

1) Product name, lot no. and country of origin are marked on a label on a transformer.

2) Lot no. marking example (manufactured on Nov 16, 2006)

3) Country of origin marking example (MADE IN JAPAN and MADE IN CHINA, etc.)

Note 1-2. As to pin connections, please refer to Section [4] Measurement Circuit.

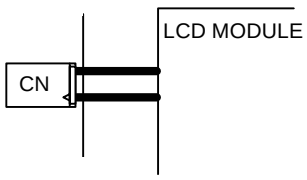
Note 1-3. Part "a" (Between the transformer (T1) and CN2, and CN3·the transformer (T2) and CN4, and CN5) in the external appearance diagram generates high voltage. When you mount a conductive material (metal frame, etc) nearby part "a" during installation, please be careful to secure 3mm or larger spacial distance in all directions around it to prevent electric discharge from the high-tension part to the conductive material.

Note 1-4. When the voltage of the output connector is measured with no load (e.g., before the cold-cathode tube is lighted), the voltage will be measured lower than the actual output, depending on the capacitance of a probe used and a measurement method, because it will be divided by the capacitance of a ballast capacitor, a high voltage probe, etc in the DC-AC inverter circuit.
In order to eliminate this error by capacitance, above output open circuit voltage is specified by measuring the output on the transformer's winding pins.

Note 1-5. The voltage applied to the load could be lower than the output open-circuit voltage when the distributed capacitance in a mounted condition is high (due to leakage of current by distributed capacitance), and makes it particularly hard to light when driving a cold-cathode tube in low temperatures. Please be careful in your installation to make the distributed capacitance as low as possible.(For example, make high-tension wiring to a cold-cathode tube as short as possible, and never use stranded wire for the high-tension wiring.)

fig1.High Voltage Code

OK



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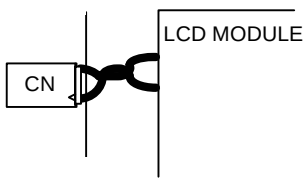


Note 1-6. In a low current zone, please confirm characteristics of the lamp beforfe use. Flickering could occur depending on a lamp.

Note 1-7. Please set the input power source capacity to 4.5A or higher. If it is less than 4.5A, there is a possibility for a circuit protection element (fuse or IC protector) not to melt.

[2] Absolute maximum rating

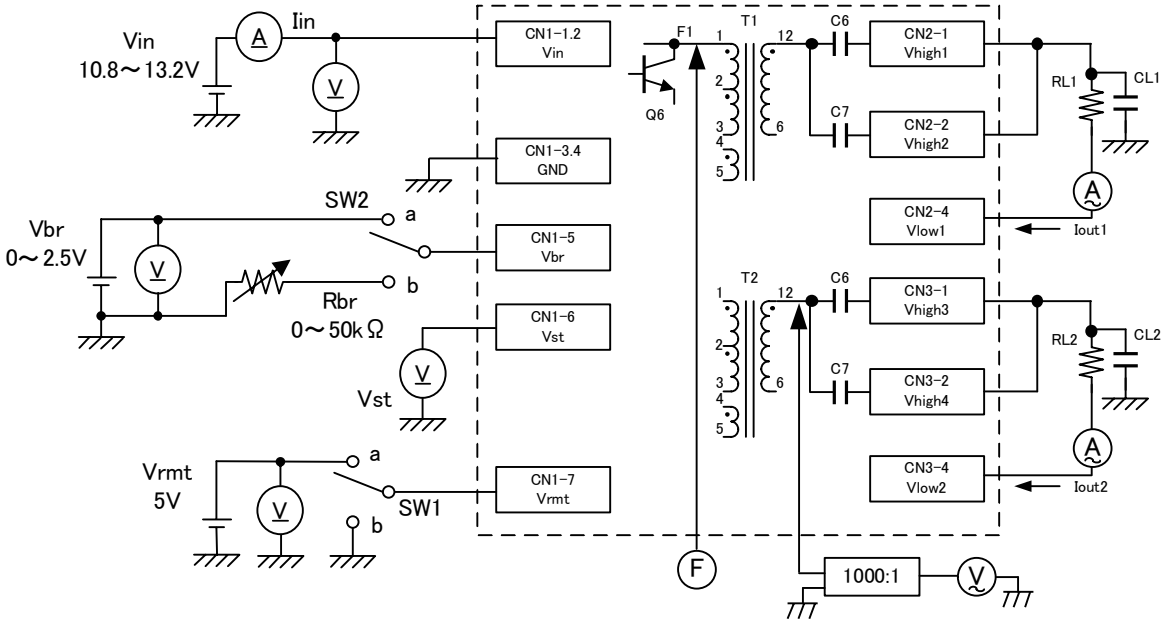
Item	Symbol	Spec	Unit	Remarks
Input votage	Vin	0 ~ 15	VDC	
	Vrmt	0 ~ Vin		
	Vbr	0 ~ 16		
Load resistance	RL1 ~ 2//CL1 ~ 2	90//5	kΩ//pF	
Operating temperature range	Ta	-20 ~ 70	℃	
Storage temperature range	Ts	-30 ~ 85	℃	
Humidity range	RH	95	%RH	Maximum wet-bulb temperature to be 38℃ No condensation to occur

Note 2-1. As the distributed capacitance for a loaded panel, 5pF is added in parallel with the load resistance.

[3] Electrical characteristics

Item	Symbol	Measurement condition					Inspection standard			Unit
		Vin(V)	Vrmt(V)	Vbr(V) / Rbr(kΩ)	Ta(℃)	RL1 ~ 4(kΩ) //CL1 ~ 4(pF)	MIN.	TYP.	MAX.	
Output current 1 (dimming max.)	Io1 ~ 4	12±1.2	5±0.25	0 / 0	0 ~ 70	85 // 4	11.6	13.0	14.4	mArms
Output current 2 (dimming min.)	Io1 ~ 4			2.5 / 50			6.0	7.4	8.8	
Input current 1	Iin1			0 / 0			-	1.5	2.25	A
Input current 2	Iin2		0	0 / 0			-	-	1	mA
Oscillation frequency	F1		5±0.25	0 / 0			48	53	58	kHz
Oscillation frequency (Duty)	F2			2.5 / 50			240	270	300	Hz
Output open-circuit voltage	Vopen			0 / 0		∞ ∞	1500	1600	2000	Vrms
Alarm output (Note 4-3)	Vst			0 / 0		85 // 4 Note 4-3.※1	4.5	5.0	5.5	V
				0 / 0		85 // 4	-	0	0.5	

[4] Measurement circuit



RL1～4:Load resistor (7W or higher)
CL1～4:Distributed capacitance capacitor (3kV or higher)

Note 4-1.
To be the one to operate as follows by ON-OFF of SW1.

SW1	Unit operation
a	Operates
b	Does not operate
Open	Does not operate

Note 4-2.
To be the one to operate as follows by switching SW2.

SW2	Unit operation
a	Voltage dimming Vbr=0～2.5V (0V:Luminance max.)
b	Volume dimming VR=0～50kΩ (0Ω:Luminance max.)

Note 4-3.Protection circuit operation

Loading condition	Alarm signal (CN1-6)※1	Shutdown function※2	LED operation
At normal times	0.5V max.	Does not shut down	Turned on
When one load (lamp) is N.G.	4.5～5.5V	Does not shut down	Turned on
When two load (lamp) is N.G.	4.5～5.5V	Does not shut down	Turned on
When three load (lamp) is N.G.	4.5～5.5V	Does not shut down	Turned on
When four load (lamp) is N.G.	4.5～5.5V	Shuts down	Turned off (in about 3 seconds)

Note 4-4.Measuring apparatus

Ⓥ Digital Multiple Meter(ADVANTEST R6451A or equivalent)

Ⓐ DC Current Meter(ADVANTEST R6451A or equivalent)

Ⓕ Frequency Countor(ADVANTEST R6452A or equivalent)

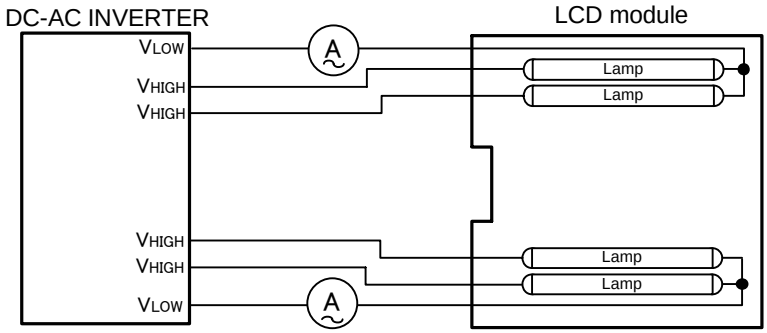
Ⓥ~ True RMS Meter(KEITHLEY 2001or equivalent)

Ⓐ~ High Frequency Current Meter(KEITHLEY 2001or equivalent)

1000:1 High Voltage Probe(Tektronix P3000 or equivalent)

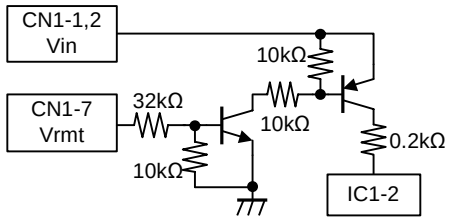
※1.5V alarm output is generated when either one of the loads or more loads turn open.
※2.This inverter includes a protection circuit that stops the operation in about 3 seconds when all the lamps turn open.

LCD module connection diagram (reference)



※Please connect the high-frequency ampere meter to the low voltage side (VLow side).

Vrmt pin circuit (reference)



[5] Various tests

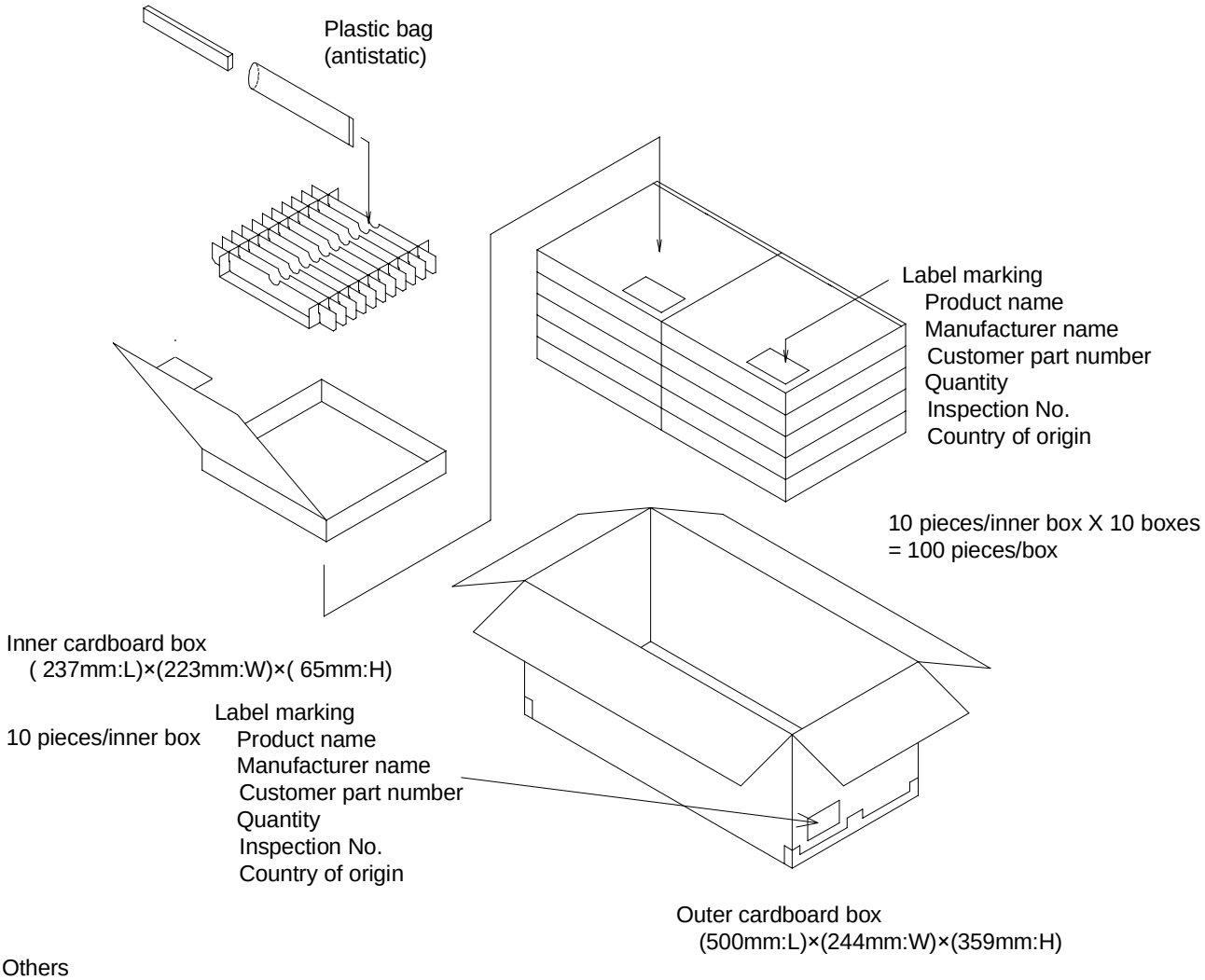
To meet the following reliability tests.

Test item	Test conditions	Judgment criteria
Low temperature exposure	-30℃ 500h	No defect to exist in electric characteristics and external appearance.
Low temperature operation	-20℃ 500h Operating condition : As rated	
High temperature exposure	85℃ 500h	
High temperature operation	70℃ 500h Operating condition : As rated	
Thermal shock	-30℃⇔85℃ 100 cycles 30 min. each	
Moisture resistance	60℃ 90 ~ 95%RH 500h	
Vibration	10 ~ 57Hz Half-amplitude 0.75mm 58 ~ 500Hz 9.8m/s^2 Sweeping time: 11 min. 60 min. each in X, Y, Z directions	
Shock	980m/s^2 11ms Sine halfwave One time. each in ±X, Y, Z directions	

[6] Packaging and marking

The product is to be packaged to be safe and free from water absorption and damage and to be marked with following items.

6-1. TDK part No. CXA-0453
6-2. Manufacture TDK
6-3. Customer part No.
6-4. QTY.
6-5. Inspection No.
6-6. Country of origin



[7] Others

7-1. Test cond.

A normal test condition :Temperature (20±15°C), Humidity (65±20%RH).

7-2. Std warrantry

One year after shipment.This covers any defects in material or workmanship. Defective units will be replaces at no charge.

7-3. MTTF

MTTF which calculated according to MIL-HDBK-217-F is as follows.

TEMPERATURES 25℃
MTTF 1150000 hours or more

7-4. Others

TDK and customer are to discuss changes,problems, and modifications and etc, when needed.