

MESSRS :

Product Drawing

CUSTOMER'S PRODUCT NAME :

TDK PRODUCT NAME: DC/AC INVERTER UNIT CXA- L0605C-VxL

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.12.2010 K.Negoro</i>	<i>April.12.2010 K.Yamaishi</i>	<i>April.12.2010 H.Masuoka</i>

DWG. No.

CTR-3818-X

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-L0605C-VxL					
TDK-Lambda	NAME OF DRAWING			DRAWING No.	PAGE	
	Product Drawing			CTR-3818-X	1	

1. Part Name

The part name is CXA-L0605C-VxL

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 Std Warranty Others	refer to [7]	8

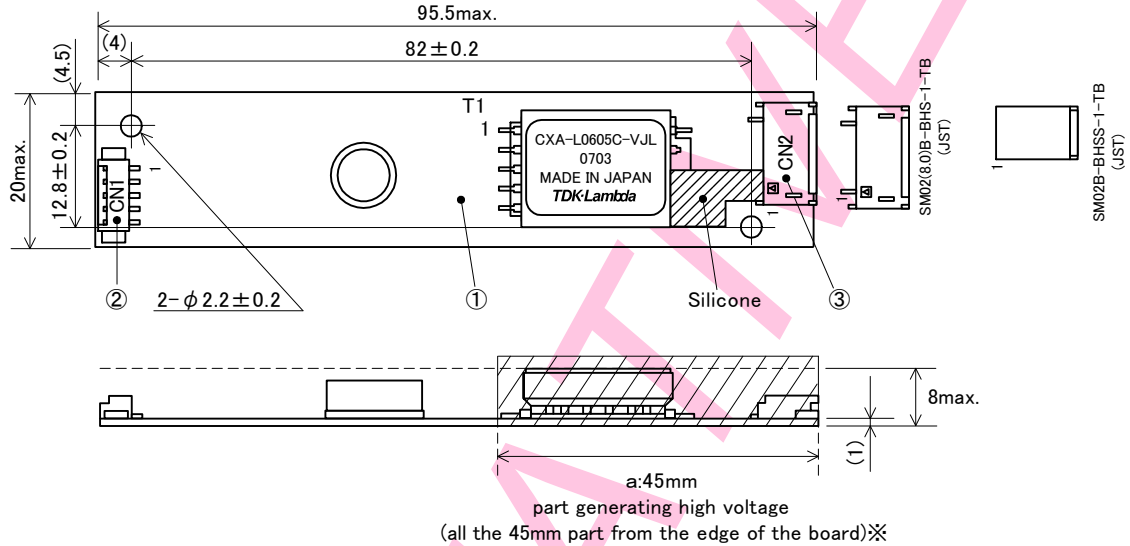
No.	MATERIALS NAME	QU	MATERIAL	REMARK
PRODUCT NAME or MODEL,TITLE				
DC-AC INVERTER UNIT CXA-L0605C-VxL				
NAME OF DRAWING		DRAWING No.		PAGE
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TDK-Lambda

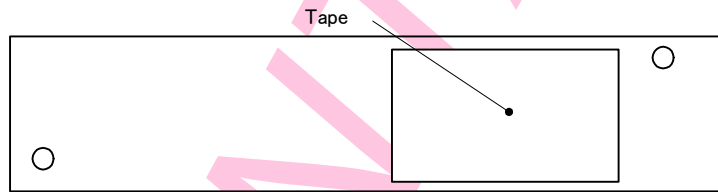
●Features●

- This inverter is one lamp. It has Dimming function(Analog Dimming System) and Remote function.
 - 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



※Please secure 3mm or longer space distance from the high voltage generating area in all directions. Please see Note 1-3 for the details.



Unit : mm
Weight : 13.7g typ.

The dimensional deviation not instructed is assumed to be ±0.5mm

No.	Part Description	Material	Qu	Remark	Mates With
①	PCB	Composite (CEM-3)	1	UL94V-0 t=1.0	-
②	Input Connector CN1	53261-0571	1	Molex	51021-0500
③	Output Connector CN2	SM02(8.0)B-BHS-1-TB(LF)(SN)	1	JST	BHR-03VS-1
		SM02B-BHSS-1-TB(LF)(SN)	1	JST	BHSR-02VS-1

*Part Name example

C X A - L 0 6 0 5 C - V □ L

Inverter
Output Power: 4~5W

Output Current: 6mA_{rms} typ
Input Voltage: 5V typ

Changing of CXA-L0605-VxL

The position of High Voltage Output terminal :
L-Left side

Output Connector---J: SM02(8.0)B-BHS-1-TB(LF)(SN)
S: SM02B-BHSS-1-TB(LF)(SN)

Dimming System: Analog Dimming

No.	MATERIALS NAME	QU	MATERIAL	REMARK
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NAME OF DRAWING		DRAWING No.		PAGE
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1-2. Connector Configuration

Input side

Pin No.	Symbols	Ratings	Notes
CN1-1	Vin	4.75~5.25V	
CN1-2	GND	0V	
CN1-3	Vrmt	0V / 2.5V-Vin	0-0.4V : OFF 2.5-Vin : ON
CN1-4	Vbr	0~3V	Control
CN1-5	N.C.	-	N.C.

Output side CN2

(CXA-L0605-VJL)

Pin No.	Symbols	Ratings
CN2-1	VHIGH	600Vrms 6mArms
CN2-2	N.C.	-
CN2-3	VLOW	(2V)

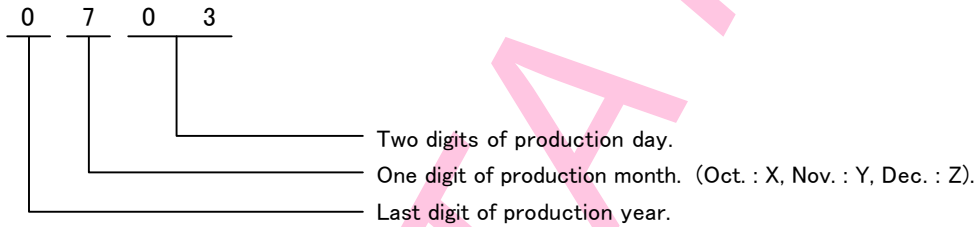
Output side CN2

(CXA-L0605-VSL)

Pin No.	Symbols	Ratings
CN2-1	VHIGH	600Vrms 6mArms
CN2-2	VLOW	(2V)

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. Jul. 3. 2010)



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

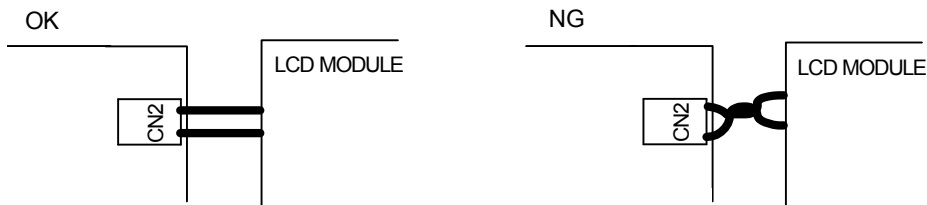
Note1-2. For circuit connection, please refer to test circuit diagram [4].

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-L0605C-VxL				
TDK-Lambda	NAME OF DRAWING		DRAWING No.	PAGE
	Product Drawing		CTR-3818-X	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 3.0A capacity for input power supply.

Note1-8. Impedance from the wire connection can cause a ripple in the input. The product has an internal fuse of 1.5A. Please check that input current peak wave form does not exceed 1.5A.

[2] Absolute maximum ratings

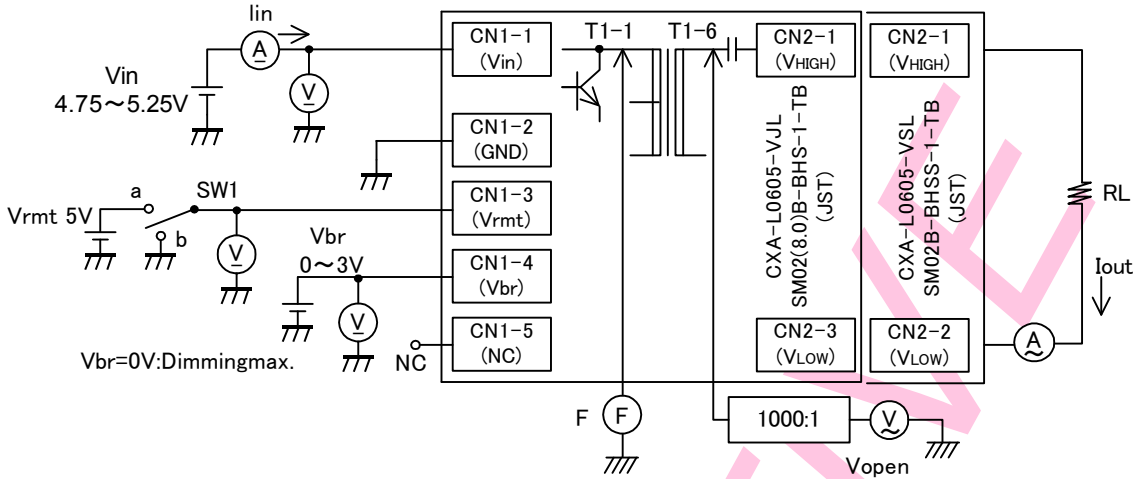
Items	Symbols	Specification	Unit	Notes
Input Voltage	Vin	0~5.25	V	
Load Resistance	RL	110max.	kΩ	
Operating Temp. range	Ta	-20~70	°C	
Storage Temp. range	Ts	-30~85	°C	
Humidity range	RH	95	%RH	A maximum wet ball temperature is 38°C No dew.

[3] Electrical specifications

Item	Symbol	Conditions				Specifications			Unit
		Vin [V]	Ta [°C]	RL [kΩ]	Vbr [V]	MIN.	TYP.	MAX.	
Output Current (Dimmingmax.)	lout1	4.75~5.25	23±5	80	0	5.4	6	6.6	mArms
	lout2	4.75~5.25	-20~70	80	0	5.3	6	6.7	
Output Current (Dimmingmin.)	lout3	4.75~5.25	23±5	80	3	2.4	3	3.6	
Input Current	Iin	5	-20~70	80	0	-	0.8	1.0	A
Frequency	F	4.75~5.25	-20~70	80	0	35	45	55	kHz
Open Circuit Voltage	Vopen	4.75~5.25	-20~70	∞	0~3	1.5	1.6	-	kVrms

No.	MATERIALS NAME	QU	MATERIAL	REMARK
PRODUCT NAME or MODEL, TITLE				
DC-AC INVERTER UNIT CXA-L0605C-VxL				
TDK-Lambda	NAME OF DRAWING		DRAWING No.	PAGE
	Product Drawing		CTR-3818-X	5

[4] Test circuit



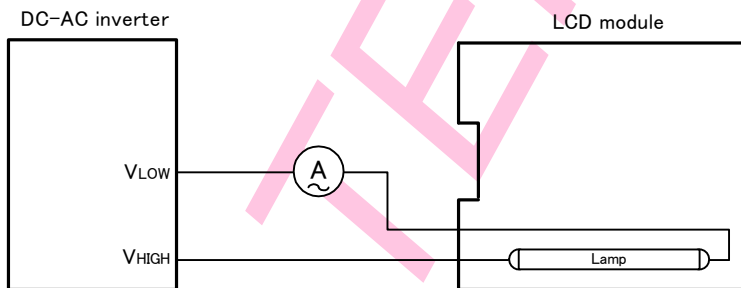
Note 4-1. SW1(ON/OFF) Operation is as following;

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

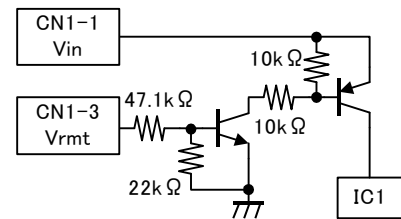
Note 4-2. Safety Function

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

LCD module Connected chart (reference)



Vvrm terminal circuit (Reference)



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

No.	MATERIALS NAME	QU	MATERIAL	REMARK
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DC-AC INVERTER UNIT CXA-L0605C-VxL				
NAME OF DRAWING		DRAWING No.		PAGE
Product Drawing		CTR-3818-X		6

TDK-Lambda

[5] Reliability test

Following test items are assured.

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

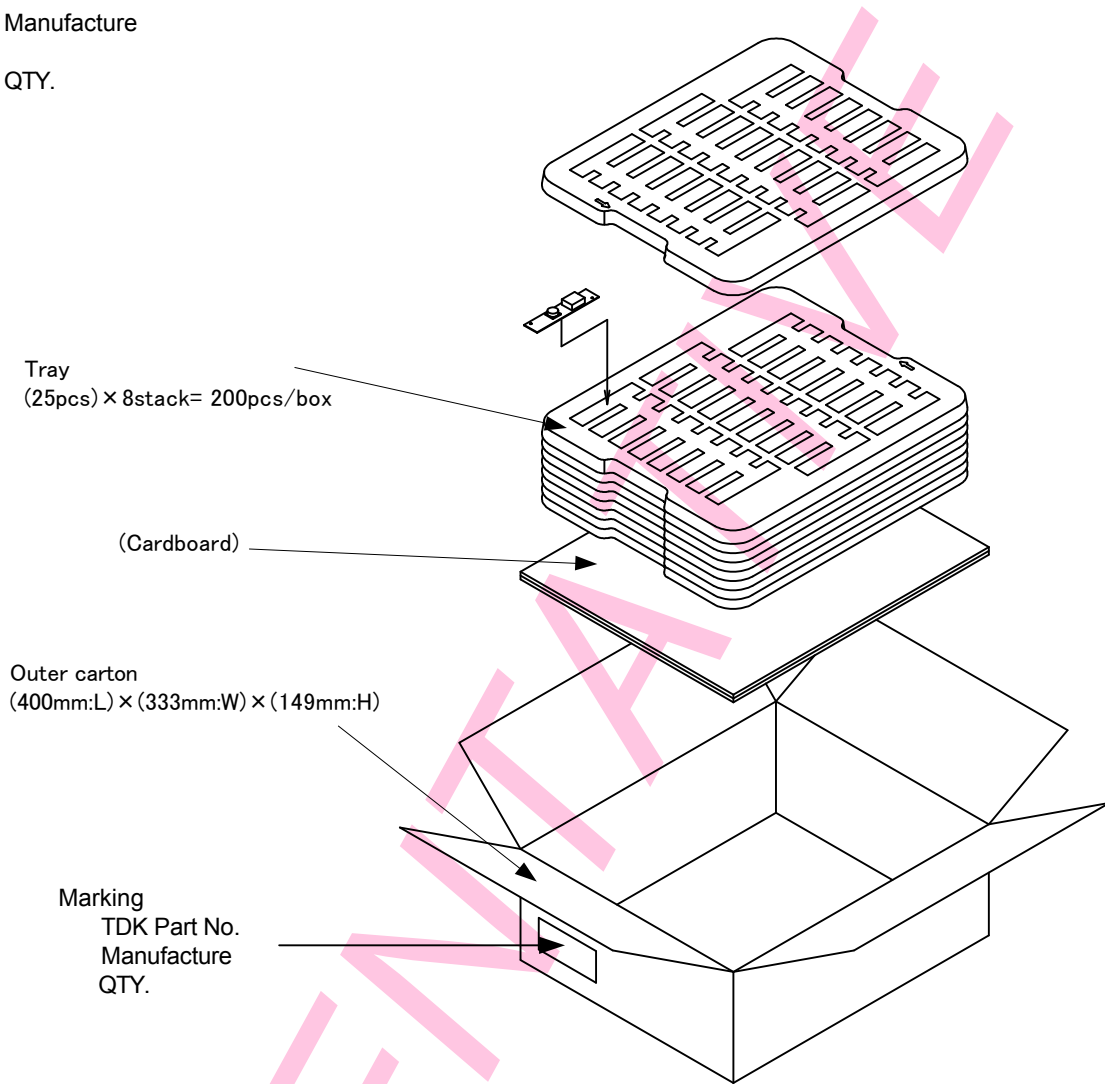
No.	MATERIALS NAME	QU	MATERIAL	REMARK
PRODUCT NAME or MODEL,TITLE				
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NAME OF DRAWING			DRAWING No.	PAGE
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TDK-Lambda

[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-L0605C-VxL
- 6-2. Manufacture
- 6-3. QTY.



[7] Others

7-1. Test conditions

Unless otherwise specified, the temperature to be $(25 \pm 15)^\circ\text{C}$ and humidity to be $(65 \pm 20) \% \text{RH}$.

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.

No.	MATERIALS NAME	QU	MATERIAL	REMARK
PRODUCT NAME or MODEL, TITLE				
DC-AC INVERTER UNIT CXA-L0605C-VxL				
TDK-Lambda	NAME OF DRAWING		DRAWING No.	PAGE
	Product Drawing		CTR-3818-X	8

Power Supplies

DC to AC Inverters

Connector type, Dimming, 4W, For 1 Bulb

CXA Series CXA-L0605-VJL

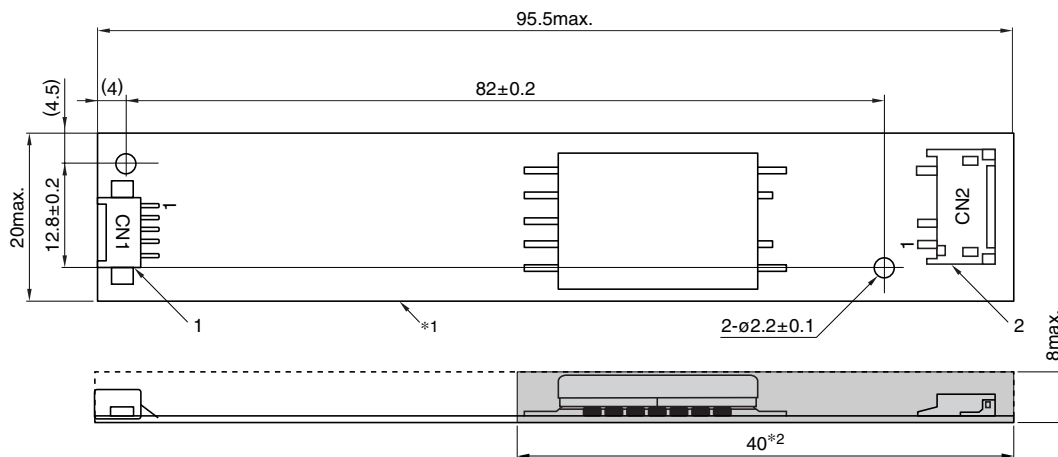
FEATURES

- The CXA-L0605-VJL is an inverter for cold cathode fluorescent lamps and features a built-in dimmer.
- Because they employ advanced output current control, fluctuations in input voltage, load, and distributed capacitance have virtually no effect on brightness.
- Output open and short circuit conditions result in no damage, heat generation, or other difficulties.
- Safe design that includes a built-in overcurrent protection element.
- Insulation is simplified due to flat backside surface of board.

TEMPERATURE AND HUMIDITY RANGES

Temperature range (°C)	Operating	0 to +60
	Storage	-20 to +85
Humidity range(%)RH	95max. [Maximum wet-bulb temperature 38°C]	

SHAPES AND DIMENSIONS



*1 Substrate (PWB: Printed wiring board): Flame retardant material UL94V-0 (FR-4 or CEM-3) $t=1\text{mm}$

Weight: 14.5g typ.

*2 : High-voltage generator (The entire surface within a range of 40mm away from the end of the base in the output)

Dimensions in mm

	Connector manufacturer's company and type	Symbol
1 Input connector	Morex Japan Co., Ltd. 53261-0590	CN1
2 Output connector	Japan Solderless Terminal Co., Ltd. SM02(8.0)B-BHS-1	CN2

TERMINAL NUMBERS AND FUNCTIONS

CN1

Terminal No.	Functions	Symbol
CN1-1	Input voltage Edc: 4.75 to 5.25V 5V[nom.]	Vin
CN1-2	0V	GND
CN1-3	Remote voltage Edc 0V: off/5 to 5.25V:on	Vrmt
CN1-4	Brightness dimmer voltage* Edc: 0 to 3V(Maximum brightness on 0V)	Vbr
CN1-5	Used in the internal circuits, do not connect.	N.C.

* Brightness can be controlled by adjusting Vbr within a range of 0 to 3V.

CN2

Terminal No.	Functions	Symbol
CN2-1	Output[High voltage] Irms 3 to 6mA	VHIGH
CN2-2	—	N.C.
CN2-3	Output[Low voltage] (2V)	VLOW

Power Supplies

CXA Series CXA-L0605-VJL

DC to AC Inverters

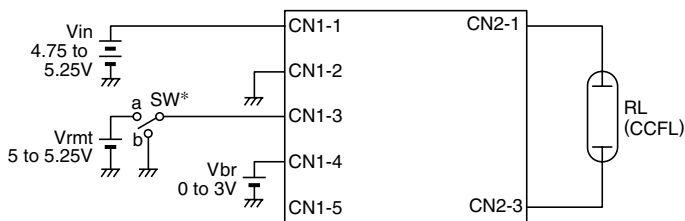
Connector type, Dimming, 4W, For 1 Bulb

ELECTRICAL CHARACTERISTICS

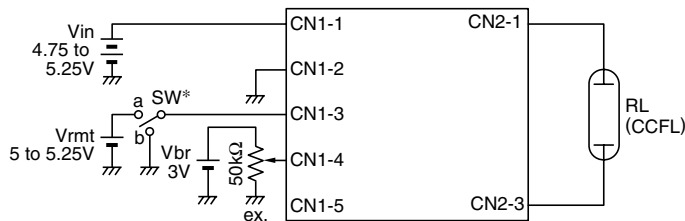
Items	Unit	Symbol	Specifications			Conditions		Ta(°C)	RL(kΩ)	Brightness
			min.	typ.	max.	Vin(V)	Vbr(V)			
Output current I _{rms}	mA	I _{out}	5.3	6	6.7	5±0.25	0	0 to 60	70 to 90	Maximum
			5.4	6	6.6	5±0.25	0	23±5	80	Maximum
			2.5	3	3.5	5±0.25	3	0 to 60	226	Minimum
Input current I _{dc}	A	I _{in}	—	0.7	0.8	5	0	23±5	80	
Oscillation frequency	kHz	F _L	35	45	55	5±0.25	0	0 to 60	70 to 90	
Open circuit output voltage E _{rms}	V	V _{open}	1500	1700	—	5±0.25	0	0 to 60	∞	

TYPICAL CONNECTIONS

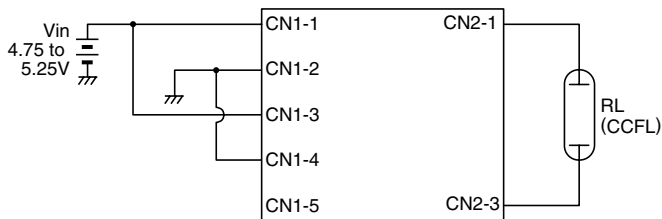
EXAMPLE OF VOLTAGE DIMMER CONTROL



EXAMPLE OF POTENTIOMETER DIMMER CONTROL

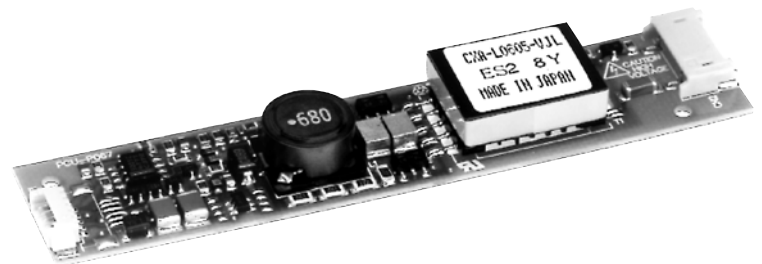
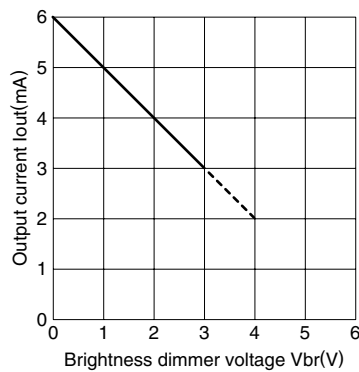


NO DIMMER CONTROL



* SW a:on, b:off

BRIGHTNESS DIMMER VOLTAGE-OUTPUT CURRENT CHARACTERISTICS



CXA-L0605A-VJL/CXA-L0605A-VSL

Dimming/Connector Type

DC-AC Inverter

■ Features

- 1 output
- Usable in a wide range of temperatures
- Applicable panel size*: 3 to 15 inches
- With brightness control function (Current dimming).
- In the high-voltage generator (a terminal and a pattern), an anti-dust measure by silicone application is taken.
(Notice) Applicable panel size becomes a standard.

■ Applications



CXA-L0605A-VJL / CXA-L0605A-VSL Specifications (Please refer to each specification before use)

Electrical Characteristics

Item	Unit	Symbol	Specification			Condition					Remarks
			min	typ	max	Vin(V)	Vrmt(V)	Vbr(V)	Ta(°C)	RL(kΩ)	
Output Current	mArms	Iout (Maximum dimmer)	5.4	6	6.6	5±0.5	5	0	23±5	100	(*1)
			5.3	6	6.7	5±0.5	5	0	-20 to +75	90 to 110	(*1)
		Iout (Minimum dimmer)	2.3	2.9	3.5	5±0.5	5	3	23±5	100	(*1)
Input Current	A	Iin	-	1.2	1.5	5±0.5	5	0	-20 to +75	100	Remote ON
Oscillatory Frequency	kHz	Freq	50	55	60	5±0.5	5	0	-20 to +75	90 to 110	
Open Circuit Voltage	Vrms	Vopen	1600	1800	-	5±0.5	5	0	-20 to +75	∞	Open load

(*1) Please refer to the connection diagram for details of a dimming method.

Other Specifications

Dimming Function		Yes
Operating Temperature	°C	-20 to +75
Storage Temperature	°C	-30 to +85
Operating Humidity Ratio	RH%	95max.
Safety Standard		—
Weight	g	14typ.
Dimensions (WxDxH)	mm	100.5x20.3x8.0 (*2)
Fused Input		Yes
Remote ON / OFF		Yes
Alarm Signal Function		No
Shutdown Function		No
Silicone Coating on High Voltage Area		Yes

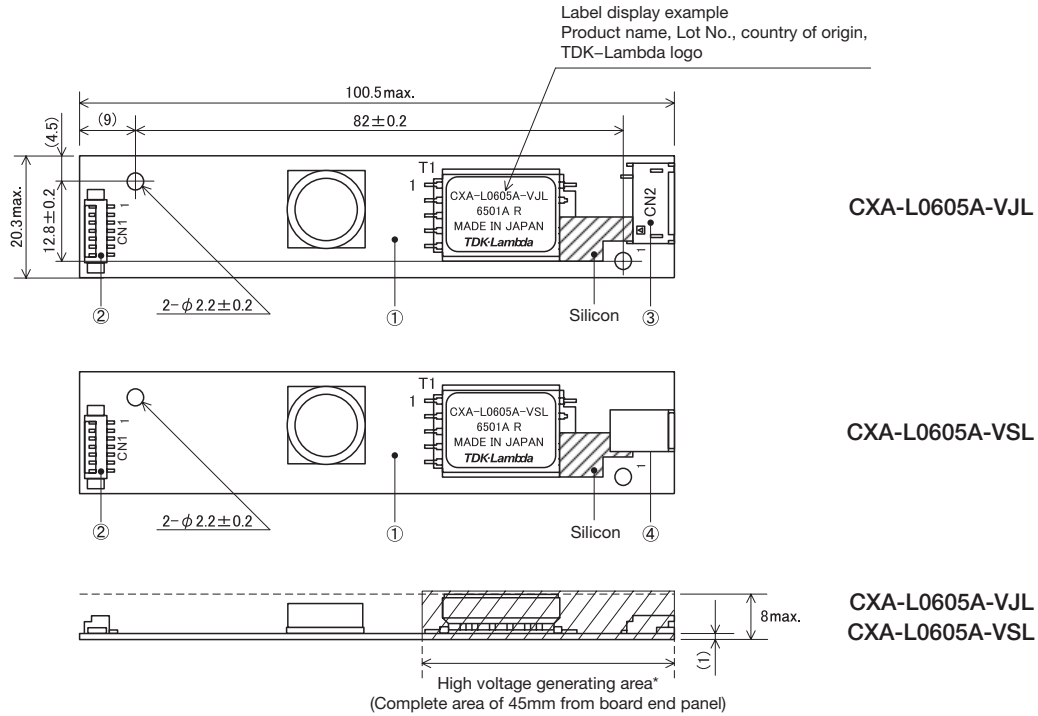
(*2) These dimensions are indicated the maximum.

■ Conformity to RoHs Directive

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

Connector type/1 output

Outline Drawing



CXA-L0605A-VJL

CXA-L0605A-VSL

CXA-L0605A-VJL
CXA-L0605A-VSL

Unit: mm

*From high-voltage generator, please secure space distance more than 3mm in top and bottom right and left.

Connector

No.	Component name	Type name	Qty	Manufacturer	Recommended suitable connector	Remarks
①	Printed circuit board PCB	Composite (CEM-3)	1	—	—	UL94V-0 t=1.0
②	Input connector CN1	53261-0771	1	Molex	51021-0700	—
③	Output connector CN2	SM02(8.0)B-BHS-1-TB(LF)(SN)	1	J.S.T Mfg., Co., Ltd	BHR-03VS-1	CXA-L0605A-VJL
④	Output connector CN2	SM02B-BHSS-1-TB(LF)(SN)	1	J.S.T Mfg., Co., Ltd	BHSR-02VS-1	CXA-L0605A-VSL

Terminal Number & Function

Input side CN1

Terminal No.	Symbol	Rating	Remarks
CN1-1	Vin	4.5 to 5.5V	Power source input
CN1-2			
CN1-3	GND	0V	Ground
CN1-4			
CN1-5	Vrmt	0V/2.5V to Vin	Remote terminal 0 to 0.4V : OFF 2.5V to Vin : ON
CN1-6	Vbr	0 to 3V	Dimmer terminal
CN1-7	N.C.	—	Because it uses for internal circuit, please be not connected.

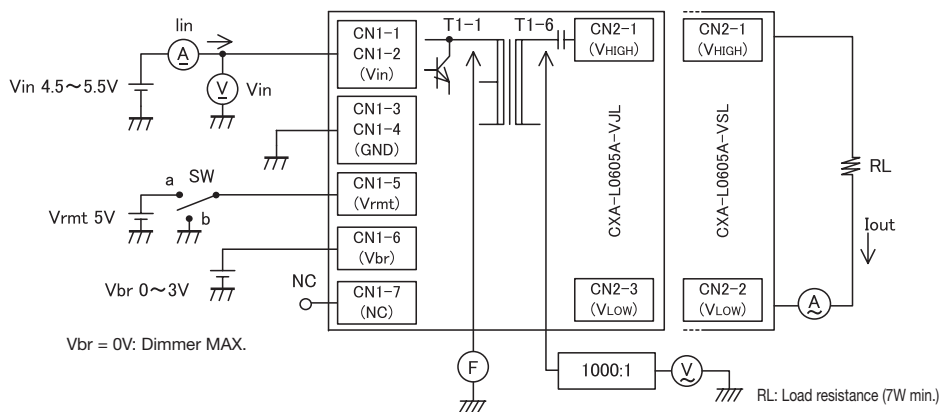
Output side CN2 (CXA-L0605A-VJL)

Terminal No.	Symbol	Rating
CN2-1	V _{HIGH}	Output
CN2-2	N.C.	—
CN2-3	V _{LOW}	Output return

Output side CN2 (CXA-L0605A-VSL)

Terminal No.	Symbol	Rating
CN2-1	V _{HIGH}	Output
CN2-2	V _{LOW}	Output return

Connections



Operate as follows by switching a SW.

SW	Unit operates
a	Operates
b	Does not operate
Open	