

**MESSRS : All the companies**

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**Product Drawing**

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**CUSTOMER'S PRODUCT NAME:**

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**TDK PRODUCT NAME: DC/DC CONVERTER UNIT ALD-605012Px131**

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**TDK-Lambda Corporation**

PREPARED BY	APPROVED BY	AUTHORIZED BY
<i>K.Negoro Sep./27th/2010</i>	<i>H.Masuoka Sep./27th/2010</i>	<i>M.Ueguri Sep./27th/2010</i>

DWG.No.	CTR-4083-X
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## Precautionary Notes Regarding the Use of This Converter

**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.**



### Caution

- This product is designed for the driving LED backlight system.  
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 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.
- 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

- 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.
- Please do not use the product, when dropping it, since there is a possibility of the parts damage.

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1. Range of Application

This specification applies to each companies.

2. Product Name

The product name is DC-DC converter unit ALD-6050012Px131.

3. Contents

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**-The specifications may be changed without any notice.**  
**-When placing orders, please confirm "Specifications" or "Product Drawing" through TDK, TDK-lambda sales or distributors.**

**<Product Summary>**

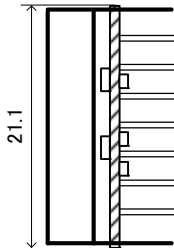
- \*This product is DC-DC converter that is designed for LED driver.
- \*This product has PWM pulse dimming function(Apply external pulse source), Analog dimming(Add an external resistor) and remote on/off function.
- \*This product has alarm function for safety operation. When load open is happened, alarm output goes high around 5V.
- \*This product has alarm function for LED open detection. If any strings are open, (1pin) outputs around 5V. When all strings are connected normally, (1pin) outputs around 0V.

[1] Appearance, Structure and Dimensions

1-1. Outline

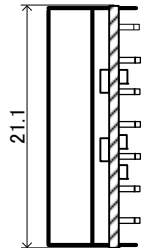
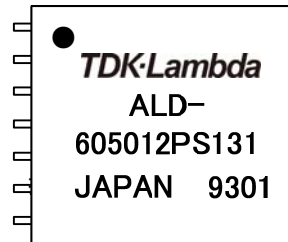
① DIP Type

Top View

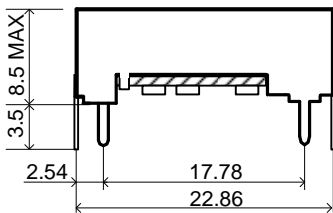


② SMD Type

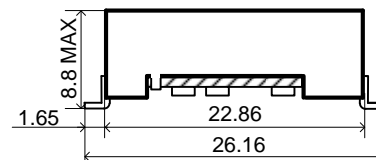
Top View



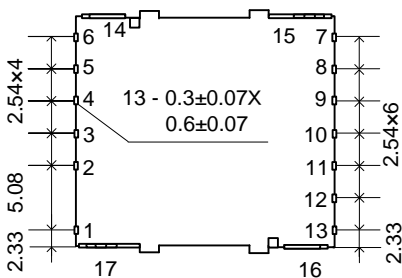
Side View



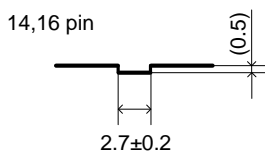
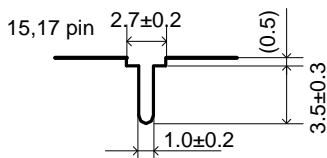
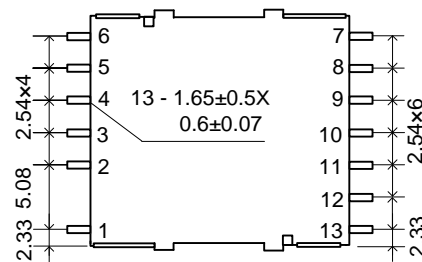
Side View



Bottom View



Bottom View



weight: 5.5g(typ.)

Tolerance is ±0.5mm unless otherwise specified.

Unit in mm

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## 1-2. Pin Configuration

(Input)

Pin No.	Symbol	Rating	Remark
1	Vst *1	0(V) / 5(V)	Alarm Output
2	Vin	10.8 - 13.2(V)	Input Voltage
3	GND	0(V)	GND
4	Vrmt	OFF : 0 - 0.4(V) ON : 2.5 - Vin(V)	ON/OFF control
5	Rbr*2 Vbr*3	1 - 10(k $\Omega$ ) 1.6 - 3.8(V)	Analog Dimming
6	Vpwm*4	0(V) : Low(OFF) 3.3(V) : Hi(ON)	PWM Dimming

\*1 Normal : 0V / Abnormal : 5V

\*2 Rbr=10k $\Omega$ :MAX. Brightness , Rbr=1k $\Omega$ :MIN. Brightness

\*3 Vbr=3.8V:MAX. Brightness , Vbr=1.6V:MIN. Brightness

\*4 Vpwm=100%:MAX. Brightness , Vpwm=1%:MIN. Brightness

(Output)

Pin No.	Symbol	Rating	Remark
7	-CH1	Output Current(Io) = 50mA/string  Output Voltage(Vo) = 30V	CH1 - Cathode side
8	-CH2		CH2 - Cathode side
9	-CH3		CH3 - Cathode side
10	Vo		CH1-6 Anode side
11	-CH4		CH4 - Cathode side
12	-CH5		CH5 - Cathode side
13	-CH6		CH6 - Cathode side

\*There is no fuse in this converter. Please use an external fuse.

This converter can be used in numerous ways.(1series,2,3,6parallel.) So, Input Current depend on connected Load.

\*When a fuse breaks, the Alarm Signal does not operate.

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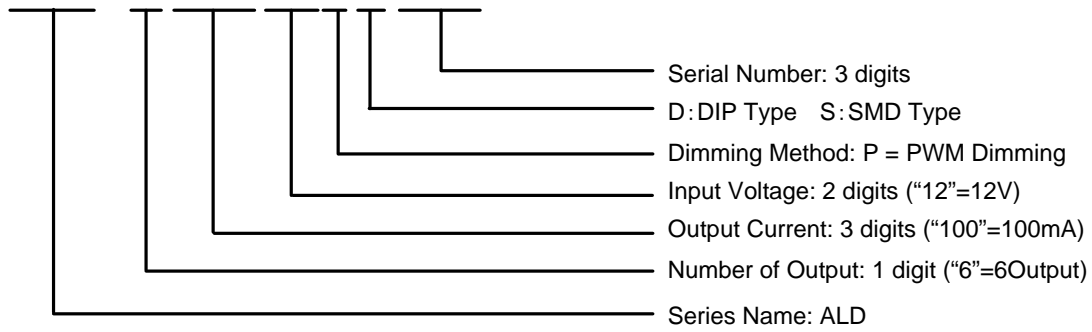
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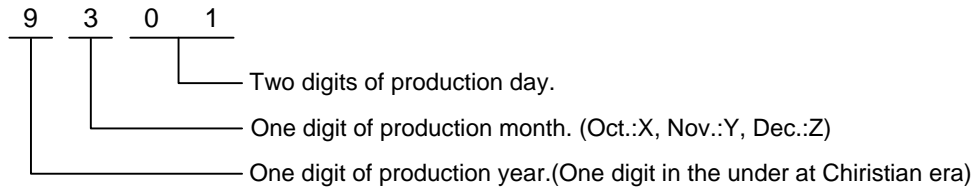
\*1-1 Product Name

**A L D - 6 0 5 0 1 2 P D 1 3 1**



\*1-2 Product name, Lot No., Country of origin

- 1) Marking is attached on a case.
- 2) Lot No. example (Mar.1st,2009)



- 3) Country of origin code (JAPAN, MALAYSIA)

[2] Using condition

2-1.Absolute Maximum Ratings

Item	Symbol	Specification	Unit	Remark
Input Voltage	Vin	0~13.2	V	
	Vrmt	0~Vin		
	Vbr	1~3.8		
	Vpwm	0~5		
	Vst	This terminal is output terminal. Don't apply external Voltage.		
Dimming Resistance	Rbr	0~10	kΩ	
Load Voltage	Vo	12.8(Vin=10.8V)~38	V	Minimum load Voltage > Vin+ 2V

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2-2.Environmental condition

Item	Symbol	Specification	Unit	Remark
Operating Temperature Range	Ta	-30~80	degC	Please refer to page7.
Storage Temperature Range	Ts	-40~85	degC	
Humidity Limit	RH	95	%RH	A maximum wet-bulb temperature is 38 degC. No dew.

2-3.Rating condition

Item	Symbol	Specification	Unit
Input Voltage	Vin	12	V
Analog Dimming	Rbr / Vbr	10 / 3.8	kΩ/V
PWM Dimming	Vpwm	100	%

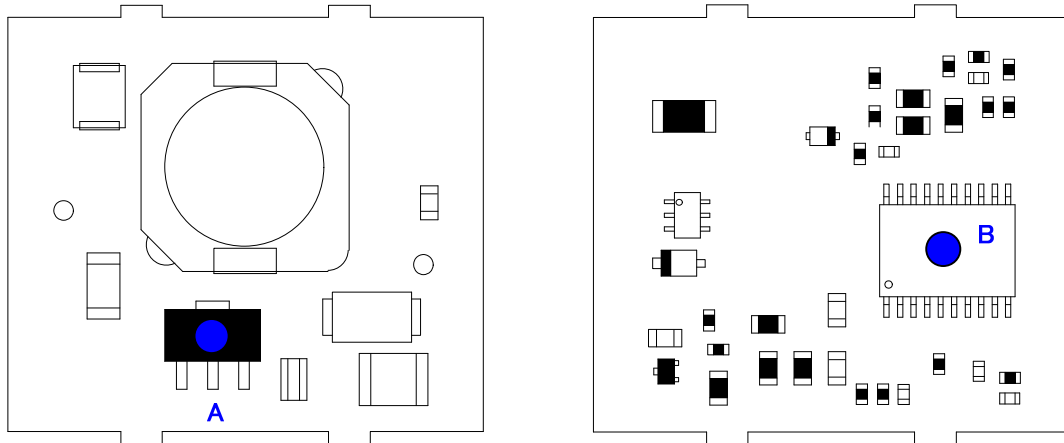
Item	Symbol	Specification	Unit
Output Voltage	Vo	30	V

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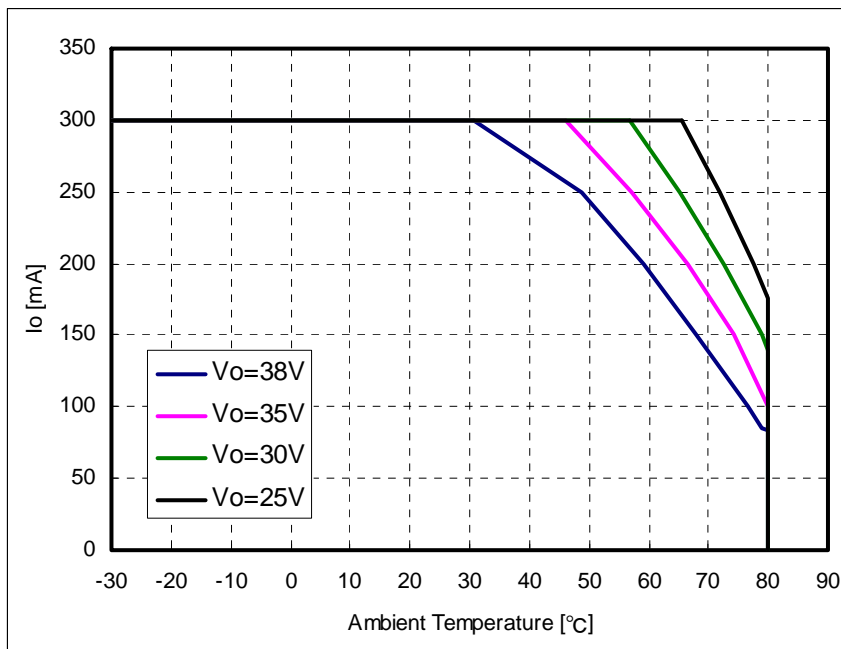
## 2-4. Temperature Derating Curve

Temperature rise is different depending on product setting.  
Please confirm in follow the procedure

- ① Detach the case from this product ,then setting on your board.
- ② Fit on thermocouple, and attach the case.
- ② Keep aging to saturation temperature on your worst-case condition (maximum output current , and Operating Temperature).
- ③ Measure following point 'A, B'.  
Please maintain a surface temperature of 'A' under 120°C.  
Please maintain a surface temperature of 'B' under 104°C.



The following is derating curve of output current on our evaluation board.  
 $I_o$  = Total  $I_o$  current of CH1 ~ 6.



\*Attention : In the case of parallel connection, temperature rise of IC (point 'B') is higher if each string has varied voltage (total of forward voltage).

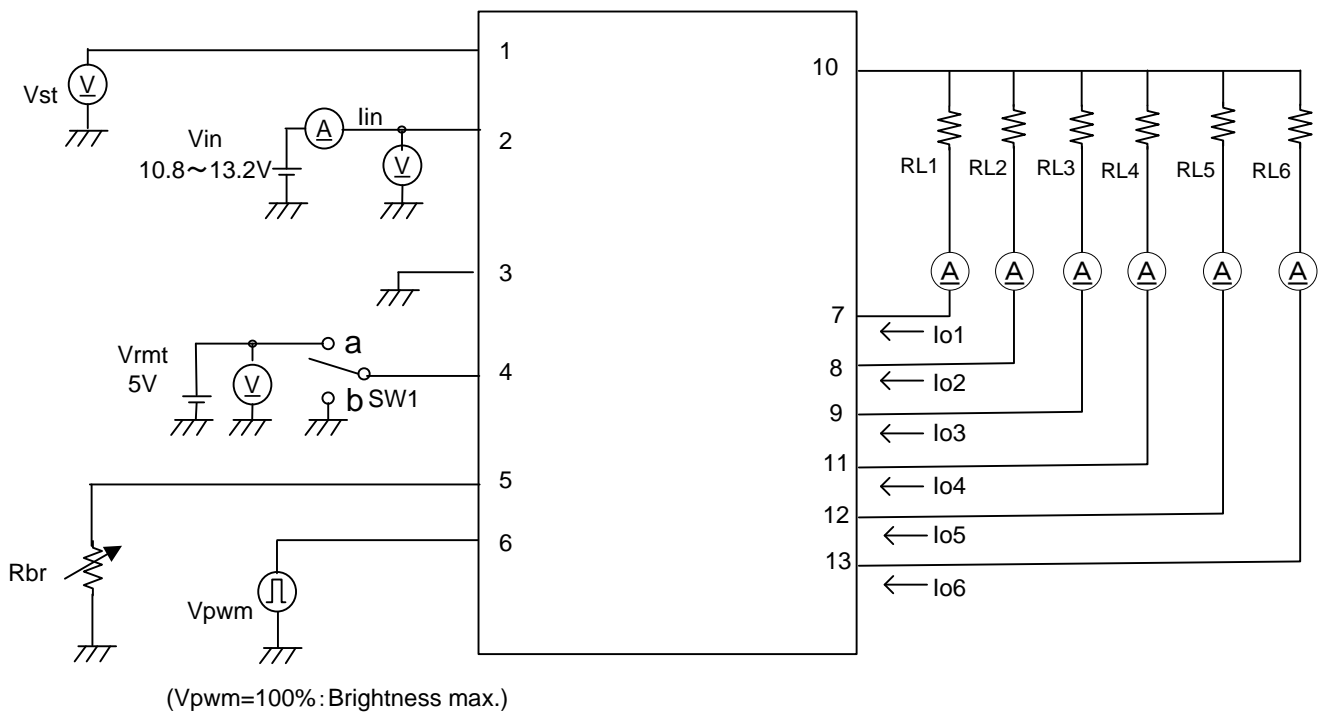
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[3]Electrical Characteristics

Item	Symbol	Condition						Specification			Unit
		Vin(V)	Vrmt(V)	Vpwm(%)	Rbr(kΩ)	Ta(°C)	RL1-3(Ω)	MIN.	TYP.	MAX.	
Output Current	Iout1-6	10.8~13.2	5±0.25	100	10	-20~55	600	40	50	60	mArms
PWM Dimming	I <sub>pwm</sub> 1-6	10.8~13.2	5±0.25	10	10	-20~80	600	3	5	7	mArms
Analog Dimming	I <sub>adim</sub> 1-6	10.8~13.2	5±0.25	100	1	-20~80	600	10	20	30	mArms
Input Current1	I <sub>in</sub> 1	12±0.5	5±0.25	100	10	-20~80	600	-	0.9	1.2	A
Input Current2	I <sub>in</sub> 2	12±0.5	0	100	10	-20~80	600	-	-	1.0	mA
Alarm Output	V <sub>st</sub> 1	10.8~13.2	5±0.25	100	10	-20~80	600	-	-	1	V
	V <sub>st</sub> 2	10.8~13.2	5±0.25	100	10	-20~80	∞	4.5	5.0	5.5	V

\*3-1 This converter has alarm output function. If any strings open, V<sub>st</sub> terminal output around 5V.  
If a string open condition occurs, other strings keep on working.

[4] Measurement Circuit



RL1-6: equivalent load resistance 600Ω (above 20W.)

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\*4-1. SW1 function

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

\*4-2.Measurement Equipment

$\text{V}$  : DC Voltage Meter  
(ADVANTEST R6452A or equivalent)

$\text{A}$  : DC Current Meter  
(ADVANTEST R6452A or equivalent)

\*4-3. Protection

Load Condition	Alarm output (Pin1)	Operation
normal	1V max.	Normal
any strings open	4.5V min.	Normal
all strings open	4.5V min.	Shutdown

\*4-4. Notice of the alarm output

The alarm output might be generated at the transition state of ON/OFF by Vrmt or Vin.

\*4-5. In PWM or Analog Dimming operation, please confirm the LCD panel before use.

Flickering may occur due to ripple noise is on Dimming pin.

[5] Reliability Test

This product is satisfied following reliability test.

Item	Condition	Judgment Standard
High Temperature Continuous Operation	80degC 500hrs. Operating cond.*	Electrical and appearance should be in the spec.
Heat Shock	-40degC <-> 85degC 30min./each 100cycles	
Humidity Environment Off and on Operation	60degC 90%R.H. On 1hr / Off 3hrs. 100cycles. Operating cond.*	
Vibration	5 ~ 10Hz Amplitude 10mm 10 ~ 200Hz Accerarated Verocity 21.6m/s <sup>2</sup> (2.2G) Log Sweep :10min. X,Y,Z direction 60min/each total 3hrs.	
Shock	588m/s <sup>2</sup> (60G) 11ms Half-sine wave once each axis X,Y,Z,-X,-Y,-Z total 6times	

\*Operating cond. : Vin=12.0V, Vpwm=100%,Vo=30V, Rbr=1.5kΩ (Io=25mA)

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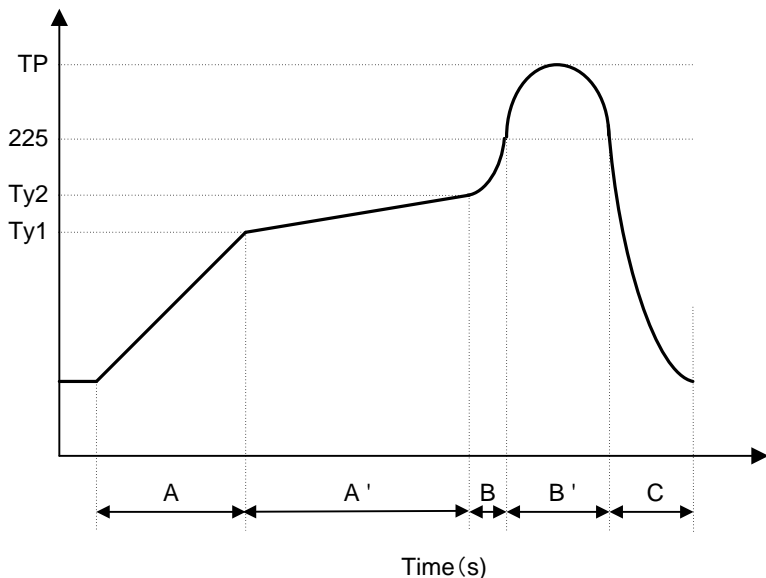
[6] Soldering Temperature

①DIP Type

Solder DIP            260°Cmax    10sec max.  
 Solder IRON        380°Cmax    3sec max.    (1time/PIN)

②SMD Type

Lead free solder / high temperature reflow process conditions are shown in below figure.  
 The number of reflow is 1 time.



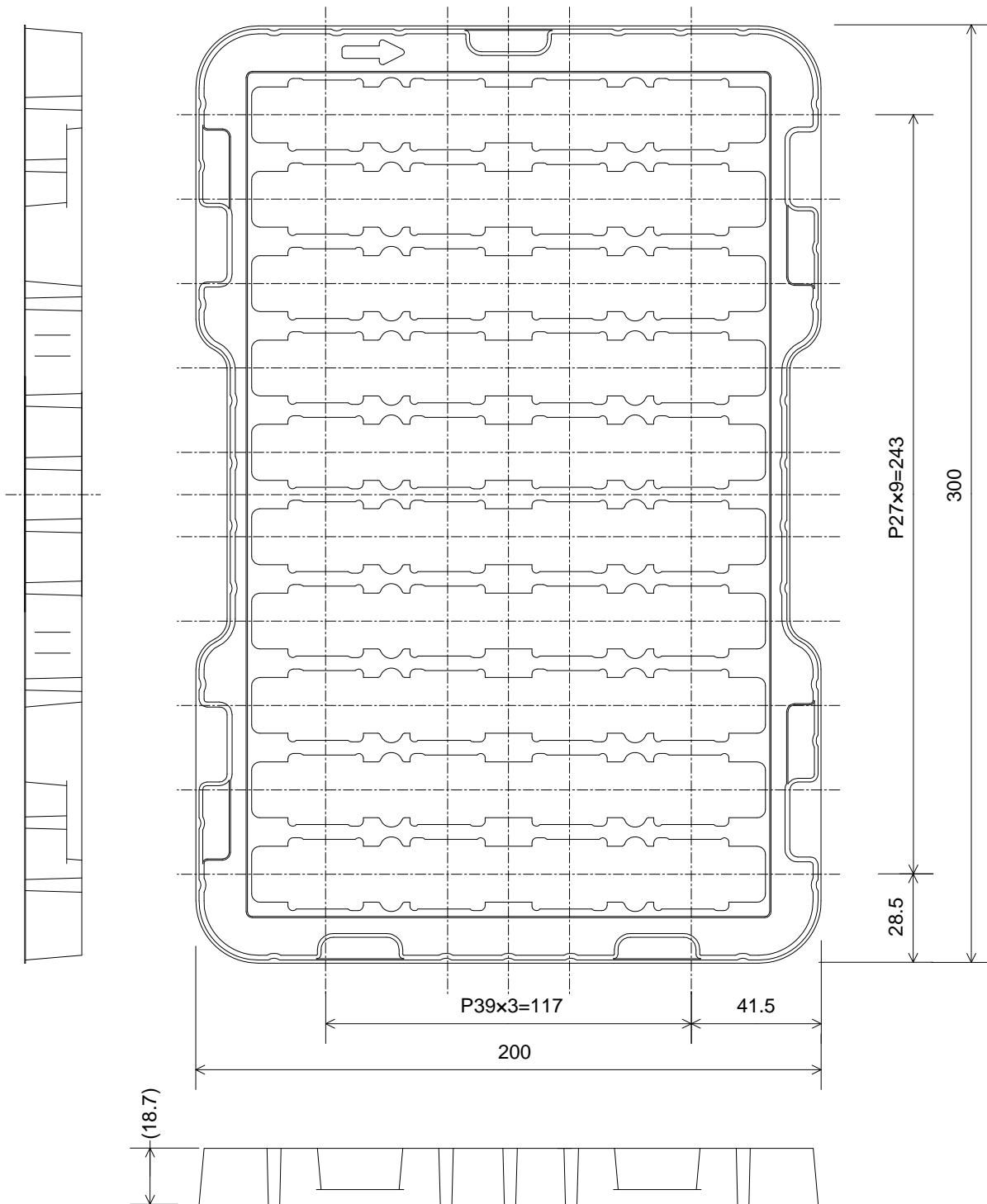
A	1.0~3.0°C/sec
A'	Ty1: 150±10°C Ty2: 170±10°C Ty1~Ty2: 20~100sec
B	1.0~4.0°C/sec
B'	TP: MAX 245°C 225°C MIN: 20~40sec
C	-1.0~-5.0°C/sec

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[7] Packaging and Marking

7-1. Individual configuration

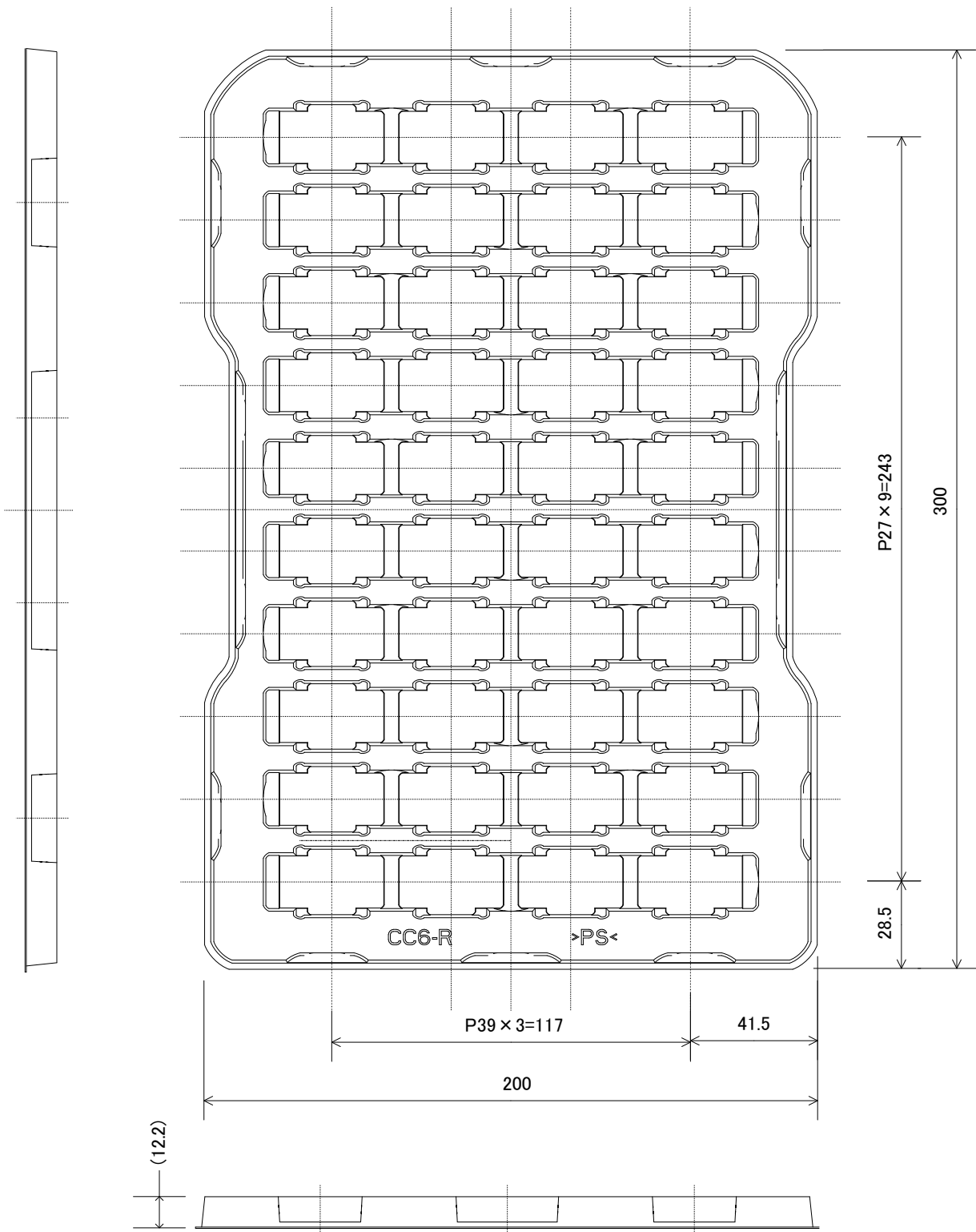
①DIP Type



Material: Antistatic Polystyrene  
(40pcs Max / Tray)

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②SMD Type



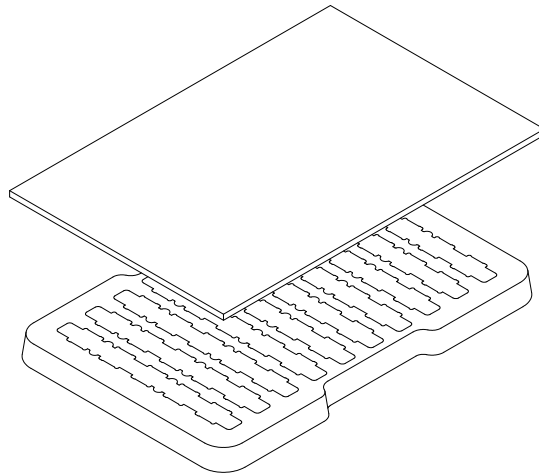
Material: Antistatic Polystyrene  
(40pcs Max / Tray)

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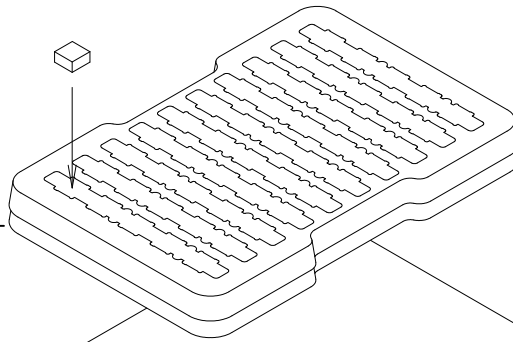
7-2. Packing configuration

①DIP Type

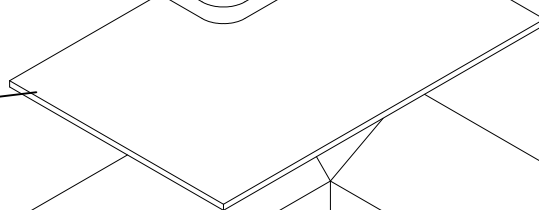
Card board  
(If empty space is existing.)



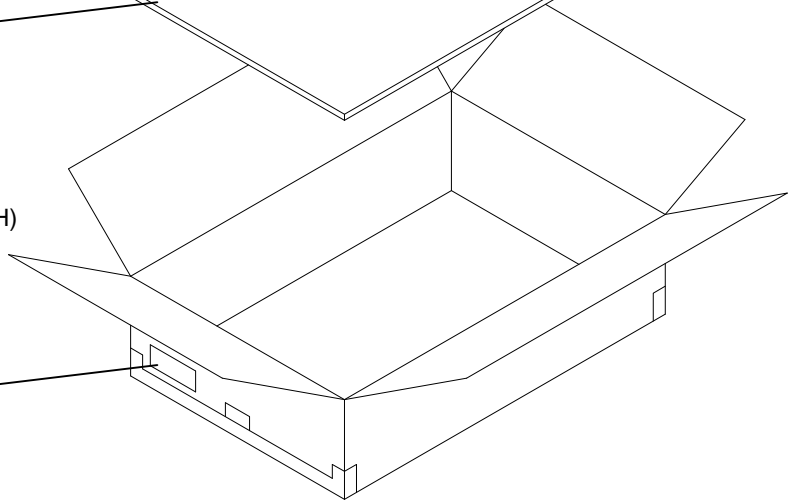
Tray(Antistatic Polystyrene)  
40pcs×4 = 160pcs/box



Bottom :Card board



Outer carton  
(321mm:L)×(221mm:W)×(104mm:H)

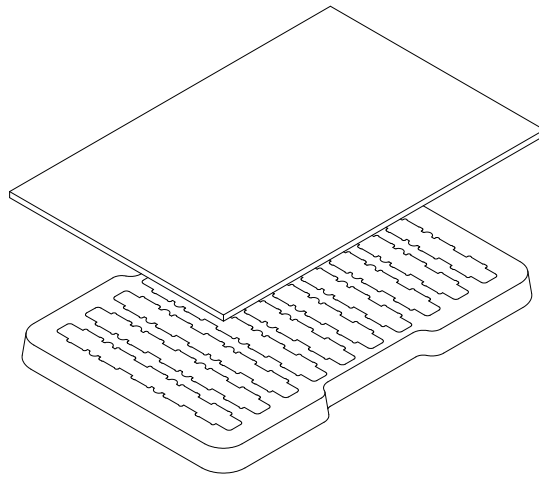


Label:  
Product Name  
Manufacturer  
Customer's Name

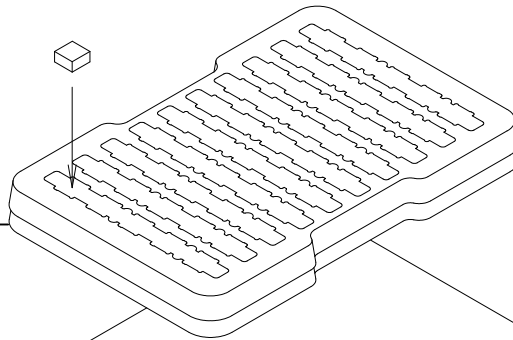
PRODUCT NAME or MODEL, TITLE			
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②SMD Type

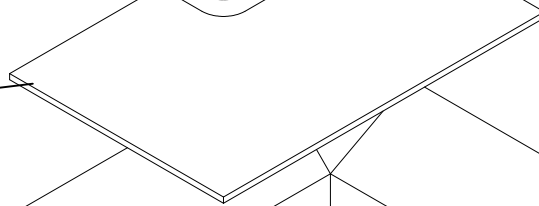
Card board  
(If empty space is existing.)



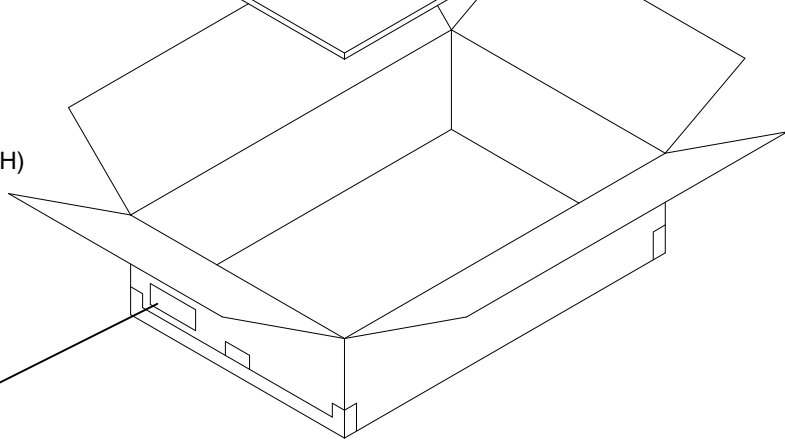
Tray(Antistatic Polystyrene)  
40pcs×5 = 200pcs/box



Bottom :Card board



Outer carton  
(321mm:L)×(221mm:W)×(104mm:H)



Label:  
Product Name  
Manufacturer  
Customer's Name

[8] Others

8-1. Test Conditions

Unless otherwise specified test environment is determined as temperature is 15~35 degC and humidity is 25~75%RH.

8-2. Warranty

One year after shipment. This covers defects in material or TDK-Lambda workmanship.  
Defects units will be replaced at no charge.

8-3. Others

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

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