SPEC. No. ED-04Q055B
ISSUE June 12, 2007

SHARP

OPTO-ANALOG DEVICES DIVISION
ELECTRONIC COMPONENTS GROUP
SHARP CORPORATION

SPECIFICATION

DEVICE SPECIFICATION FOR

VOLTAGE REGULATOR

MODEL No.

PQ***DNA1ZPH

Applied Model No.

	PQ033DNA1ZPH
	PQ050DNA1ZPH
	PQ080DNA1ZPH
	PQ090DNA1ZPH
	PQ120DNA1ZPH

Specified for

Enclosed please find copies of the Specifications which consists of 20 pages including cover.
This specification sheets and attached sheets shall be both side copy.
After confirmation of the contents, please be sure to send back ☐ copies of the Specifications with approving signature on each.

CUSTOMER'S APPROVAL

DATE

BY

PRESENTED

DATE June 13, 2007

BY H. Imanaka

H.Imanaka,
Department General Manager of
Engineering Dept.,II
Opto-Anlog Devices Div.
ELECOM Group
SHARP CORPORATION

REFERENCE

Product name : VOLTAGE REGULATOR

Model No. : PQ***DNA1ZPH

Applied Model No. : PQ033DNA1ZPH, PQ050DNA1ZPH, PQ080DNA1ZPH, PQ090DNA1ZPH, PQ120DNA1ZPH

1. These specification sheets include materials protected under copyright of Sharp Corporation ("Sharp"). Please do not reproduce or cause anyone to reproduce them without Sharp's consent.

2. When using this product, please observe the absolute maximum ratings and the instructions for use outlined in these specification sheets, as well as the precautions mentioned below. Sharp assumes no responsibility for any damage resulting from use of the product which does not comply with the absolute maximum ratings and the instructions included in these specification sheets, and the precautions mentioned below.

(Precautions)

(1) This product is designed for use in the following application areas ;

- OA equipment
- Audio visual equipment
- Home appliances
- Telecommunication equipment (Terminal)
- Measuring equipment
- Tooling machines
- Computers

If the use of the product in the above application areas is for equipment listed in paragraphs (2) or (3), please be sure to observe the precautions given in those respective paragraphs.

(2) Appropriate measures, such as fail-safe design and redundant design considering the safety design of the overall system and equipment, should be taken to ensure reliability and safety when this product is used for equipment which demands high reliability and safety in function and precision, such as ;

- Transportation control and safety equipment (aircraft, train, automobile etc.)
- Traffic signals
- Gas leakage sensor breakers
- Rescue and security equipment
- Other safety equipment

(3) Please do not use this product for equipment which require extremely high reliability and safety in function and precision, such as ;

- Space equipment
- Telecommunication equipment (for trunk lines)
- Nuclear power control equipment
- Medical equipment

(4) Please contact and consult with a Sharp sales representative if there are any questions regarding interpretation of the above three paragraphs.

3. Please contact and consult with a Sharp sales representative for any questions about this product.

1. Application

This specification applies to the outline and characteristics of tape packing type series regulator (linear type), Model No. PQ***DNA1ZPH.

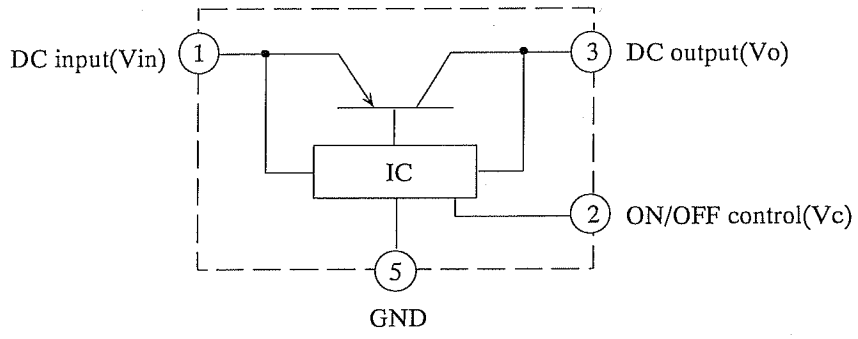
Applied Model name

PQ033DNA1ZPH, PQ050DNA1ZPH, PQ080DNA1ZPH, PQ090DNA1ZPH, PQ120DNA1ZPH

Usage

PQ***DNA1ZPH are the devices for stabilization of DC positive output voltage with the built-in ON/OFF function, the over current protection function, the overheat protection function, and ASO protection and is low consumption current type at OFF-state (stand-by).These devices are possible to use in power supply circuit up to current capacity 1A.

Block diagram



2. Outline : Refer to the attached sheet, Page 4.

3. Ratings and characteristics : Refer to the attached sheet, Page 5 to 10.
   - 3.1 Absolute maximum ratings
   - 3.2 Electrical characteristics
   - 3.3 Electrical characteristics measuring circuit
   - 3.4 Pd-Ta rating (Typical value)

4. Reliability : Refer to the attached sheet, Page 11.

5. Outgoing inspection : Refer to the attached sheet, Page 12.

6. Supplement : Refer to the attached sheet, Page 12 to 16.
   - 6.1 Example of application
   - 6.2 Over current protection characteristics (Typical value)
   - 6.3 Taping and reel packaging
   - 6.4 ODS materials

     ①This product shall not contain the following materials.

     ②Also, the following materials shall not be used in the production process for this product.

     Materials for ODS : CFC_S, Halon, Carbon tetrachloride, 1.1.1-Trichloroethane (Methyl chloroform)

6.5 Compliance with each regulation

6.5.1 The RoHS directive(2002/95/EC)

This product complies with the RoHS directive(2002/95/EC).

Object substances: mercury, lead (except for lead in high melting temperature type solders[*1]), cadmium, hexavalent chromium, polybrominated biphenyls (PBB) and polybrominated diphenyl ethers (PBDE)

*1 : i.e. tin-lead solder alloys containing more than 85% lead

6.5.2 Content of six substances specified in Management Methods for Control of Pollution Caused by Electronic formation Products Regulation (Chinese : 电子信息产品污染控制管理办法).

Category	Toxic and hazardous substances					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent chromium (Cr^{6+})	Polybrominated biphenyls (PBB)	Polybrominated diphenyl ethers (PBDE)
Voltage regulator	*	✓	✓	✓	✓	✓

✓ : indicates that the content of the toxic and hazardous substance in all the homogeneous materials of the part is below the concentration limit requirement as described in SJ/T 11363-2006 standard.

* : indicates that the content of the toxic and hazardous substance in at least one homogeneous material of the part exceeds the concentration limit requirement as described in SJ/T 11363-2006 standard.

Lead in high melting temperature type solders (i.e. tin-lead solder alloys containing more than 85% lead) (designated by "*" in the above table) are exempt from the RoHS directive (2002/95/EC), because there is no effective way to eliminate or substitute them by present scientific technology.

6.6 Specific brominated flame retardants

Specific brominated flame retardants such as the $PBBO_S$ and PBB_S are not used in this device at all.

6.7 This product is not designed as electromagnetic and ionized-particle radiation resistant.

7. Notes : Refer to the attached sheet, Page 17 to 19.

7.1 External connection

7.2 Thermal protection design

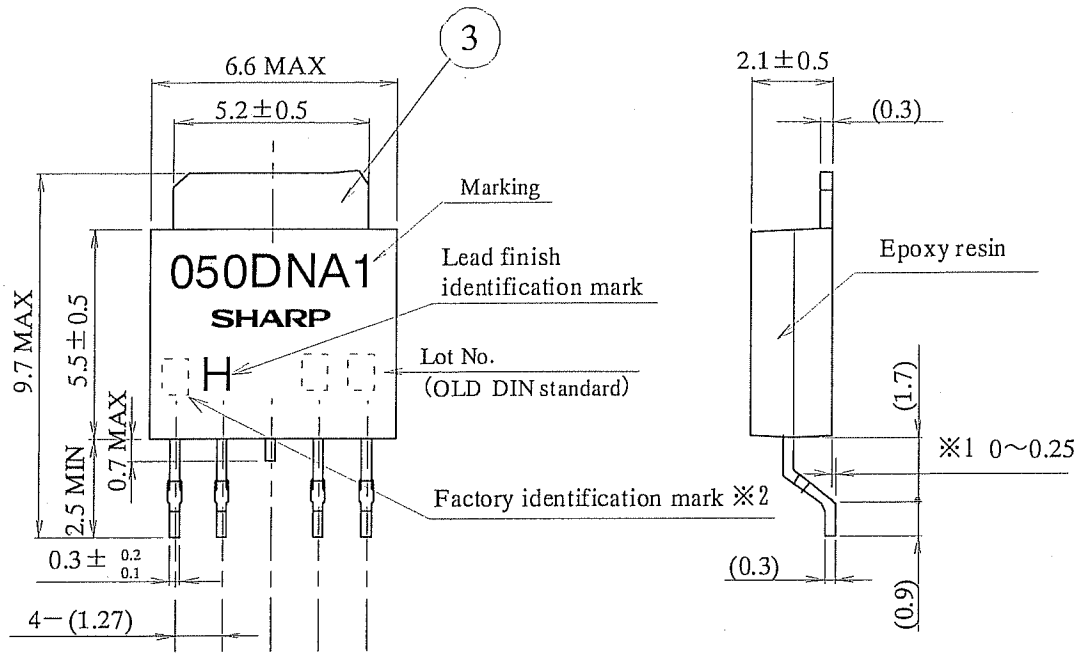
7.3 Static electricity

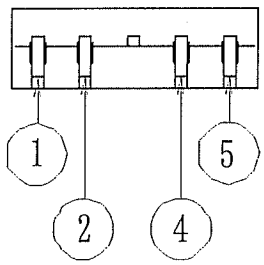
7.4 Soldering

7.5 Cleaning

7.6 Storage environment

2. Outline





・ ※ Reference value
・ ( ) : TYP.
・ Unit : mm
・ Scale : 5/1

① DC input (Vin)
② ON/OFF Control (Vc)
③ DC output (Vo)
④ NC
⑤ GND

※2 Without : Fujimoto Electric. Co., Ltd.
◿ : P.T.SHARP SEMICONDUCTOR INDONESIA
◇ : Fujimoto International Technology Corp.

Lead finish : Lead-free Solder plating
(Composition : Sn2Cu)
Lead material : Cu
Product mass : (0.23g)

Applied Model No.	Marking
PQ033DNA1ZPH	033DNA1
PQ050DNA1ZPH	050DNA1
PQ080DNA1ZPH	080DNA1
PQ090DNA1ZPH	090DNA1
PQ120DNA1ZPH	120DNA1

* Marked Model No.is in accordance with the applied model.

3. Ratings and characteristics

3.1 Absolute maximum ratings

Ta=25℃

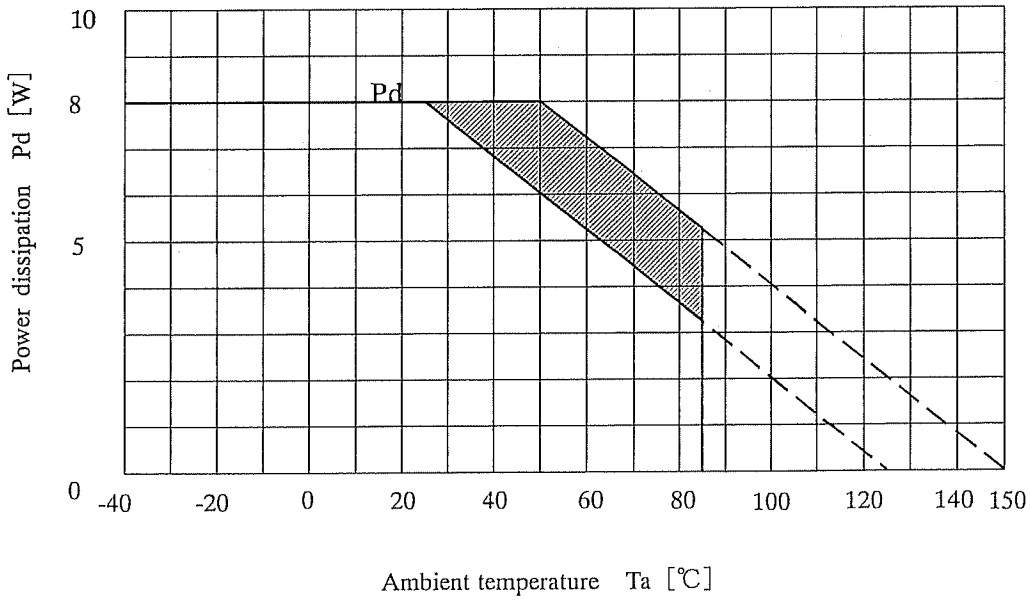
Parameter	Symbol	Rating	Unit	Conditions
Input voltage (*1)	Vin	24	V	
Output control voltage (*1)	Vc	24	V	
Output current	Io	1	A	
Power dissipation (*2)	Pd	8	W	Refer to Fig. 1
Junction temperature (*3)	Tj	150	℃	
Operating temperature	Topr	-40 to +85	℃	
Storage temperature	Tstg	-40 to +150	℃	
Soldering temperature	Tsol	260	℃	For 10 s

(*1) All are open except GND and applicable terminals.

(*2) Pd : With infinite heat sink

(*3) There is case that over heat protection function operates at the temperature Tj=125 to 150℃,so this item cannot be used in this temperature range.

Fig. 1 Inner derating curve



Pd : With infinite heat sink

(Note) There is case that over heat protection function operates at oblique line portion.

Regarding thermal design,please consider "3.4 Power dissipation vs Ambient temperature"with priority.

3.2 Electrical characteristics

(1) PQ033DNA1ZPH

Unless otherwise specified condition shall be Vin=5V, Io=0.5A Vc=2.7V Ta=25℃

Parameter	Symbol	MIN.	TYP.	MAX.	Unit	Conditions
Output voltage	Vo	3.218	3.300	3.382	V	
Load regulation	RegL	-	0.2	1.0	%	Io=5mA to 1A
Line regulation	RegI	-	0.2	1.0	%	Vin=4 to 14V, Io=5mA
Temperature coefficient of output voltage	TcVo	-	±0.01	-	%/℃	Io=5mA, Tj=0 to 125℃
Ripple rejection	RR	-	60	-	dB	Refer to Fig.3
Dropout voltage	Vi-o	-	0.2	0.5	V	Vin=3.5V ,Io=0.5A
On-state voltage for control (*5)	Vc (on)	2.0	-	-	V	
On-state current for control	Ic (on)	-	-	200	μA	Vc=2.7V
Off-state voltage for control	Vc (off)	-	-	0.8	V	
Off-state current for control	Ic (off)	-	-	2	μA	Vc=0.4V
Quiescent current	Iq	-	4	8	mA	Io=0A
Output off-state consumption current	Iqs	-	-	5	μA	Io=0A, Vc=0.4V

(*5) In case that the control terminal (② pin) is non-connection, output voltage should be OFF state.

(2) PQ050DNA1ZPH

Unless otherwise specified condition shall be Vin=7V, Io=0.5A Vc=2.7V Ta=25℃

Parameter	Symbol	MIN.	TYP.	MAX.	Unit	Conditions
Output voltage	Vo	4.875	5.000	5.125	V	
Load regulation	RegL	-	0.2	1.0	%	Io=5mA to 1A
Line regulation	RegI	-	0.2	1.0	%	Vin=6 to 16V, Io=5mA
Temperature coefficient of output voltage	TcVo	-	±0.01	-	%/℃	Io=5mA, Tj=0 to 125℃
Ripple rejection	RR	-	60	-	dB	Refer to Fig.3
Dropout voltage	Vi-o	-	0.2	0.5	V	(*4), Io=0.5A
On-state voltage for control (*5)	Vc (on)	2.0	-	-	V	
On-state current for control	Ic (on)	-	-	200	μA	Vc=2.7V
Off-state voltage for control	Vc (off)	-	-	0.8	V	
Off-state current for control	Ic (off)	-	-	2	μA	Vc=0.4V
Quiescent current	Iq	-	4	8	mA	Io=0A
Output off-state consumption current	Iqs	-	-	5	μA	Io=0A, Vc=0.4V

(*4) Input voltage when output voltage falls 0.95Vo by input voltage falling down.

(*5) In case that the control terminal (② pin) is non-connection, output voltage should be OFF state.

(3) PQ080DNA1ZPH

Unless otherwise specified condition shall be Vin=10V, Io=0.5A Vc=2.7V Ta=25℃

Parameter	Symbol	MIN.	TYP.	MAX.	Unit	Conditions
Output voltage	Vo	7.8	8.0	8.2	V	
Load regulation	RegL	-	0.2	1.0	%	Io=5mA to 1A
Line regulation	RegI	-	0.2	1.0	%	Vin=9 to 19V, Io=5mA
Temperature coefficient of output voltage	TcVo	-	±0.01	-	%/℃	Io=5mA, Tj=0 to 125℃
Ripple rejection	RR	-	60	-	dB	Refer to Fig.3
Dropout voltage	Vi-o	-	0.2	0.5	V	(*4), Io=0.5A
On-state voltage for control (*5)	Vc (on)	2.0	-	-	V	
On-state current for control	Ic (on)	-	-	200	μA	Vc=2.7V
Off-state voltage for control	Vc (off)	-	-	0.8	V	
Off-state current for control	Ic (off)	-	-	2	μA	Vc=0.4V
Quiescent current	Iq	-	4	8	mA	Io=0A
Output off-state consumption current	Iqs	-	-	5	μA	Io=0A, Vc=0.4V

(*4) Input voltage when output voltage falls 0.95Vo by input voltage falling down.

(*5) In case that the control terminal (② pin) is non-connection, output voltage should be OFF state.

(4) P090DNA1ZPH

Unless otherwise specified condition shall be Vin=11V, Io=0.5A Vc=2.7V Ta=25℃

Parameter	Symbol	MIN.	TYP.	MAX.	Unit	Conditions
Output voltage	Vo	8.775	9.000	9.225	V	
Load regulation	RegL	-	0.2	1.0	%	Io=5mA to 1A
Line regulation	RegI	-	0.2	1.0	%	Vin=10 to 20,V Io=5mA
Temperature coefficient of output voltage	TcVo	-	±0.01	-	%/℃	Io=5mA, Tj=0 to 125℃
Ripple rejection	RR	-	60	-	dB	Refer to Fig.3
Dropout voltage	Vi-o	-	0.2	0.5	V	(*4), Io=0.5A
On-state voltage for control (*5)	Vc (on)	2.0	-	-	V	
On-state current for control	Ic (on)	-	-	200	μA	Vc=2.7V
Off-state voltage for control	Vc (off)	-	-	0.8	V	
Off-state current for control	Ic (off)	-	-	2	μA	Vc=0.4V
Quiescent current	Iq	-	4	8	mA	Io=0A
Output off-state consumption current	Iqs	-	-	5	μA	Io=0A, Vc=0.4V

(*4) Input voltage when output voltage falls 0.95Vo by input voltage falling down.

(*5) In case that the control terminal (② pin) is non-connection, output voltage should be OFF state.

(5) PQ120DNA1ZPH

Unless otherwise specified condition shall be Vin=14V, Io=0.5A Vc=2.7V Ta=25℃

Parameter	Symbol	MIN.	TYP.	MAX.	Unit	Conditions
Output voltage	Vo	11.7	12.0	12.3	V	
Load regulation	RegL	-	0.2	1.0	%	Io=5mA to 1A
Line regulation	RegI	-	0.2	1.0	%	Vin=13 to 23V, Io=5mA
Temperature coefficient of output voltage	TcVo	-	±0.01	-	%/℃	Io=5mA, Tj=0 to 125℃
Ripple rejection	RR	-	60	-	dB	Refer to Fig.3
Dropout voltage	Vi-o	-	0.2	0.5	V	(*4), Io=0.5A
On-state voltage for control (*5)	Vc (on)	2.0	-	-	V	
On-state current for control	Ic (on)	-	-	200	μA	Vc=2.7V
Off-state voltage for control	Vc (off)	-	-	0.8	V	
Off-state current for control	Ic (off)	-	-	2	μA	Vc=0.4V
Quiescent current	Iq	-	4	8	mA	Io=0A
Output off-state consumption current	Iqs	-	-	5	μA	Io=0A, Vc=0.4V

(*4) Input voltage when output voltage falls 0.95Vo by input voltage falling down.

(*5) In case that the control terminal (② pin) is non-connection, output voltage should be OFF state.

3.3 Electrical characteristics measuring circuit

Fig. 2 Standard measuring circuit of Regulator portion

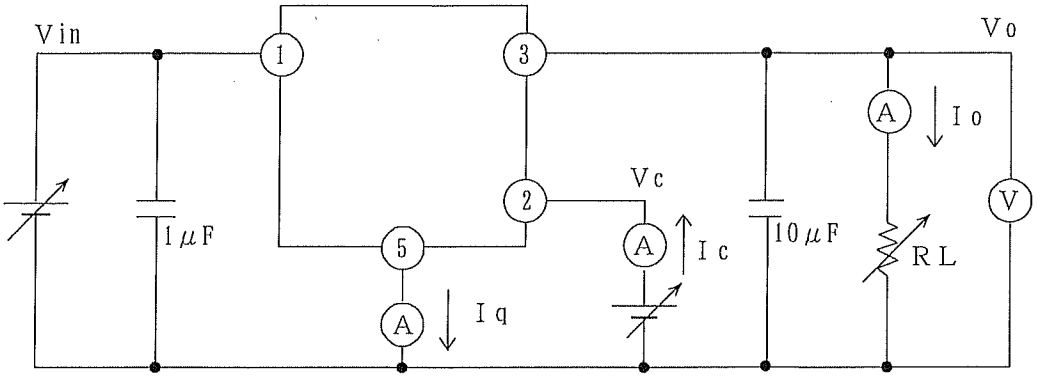


Fig. 3 Standard measuring circuit of critical rate of ripple rejection

f=120Hz sine wave

ei(rms)=0.5V

Vin=5V (PQ033DNA1ZPH)

Vin=7V (PQ050DNA1ZPH)

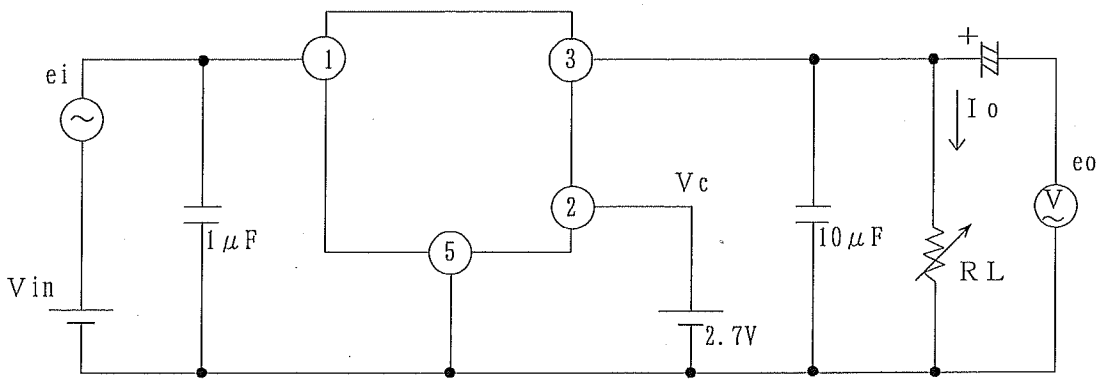
Vin=10V (PQ080DNA1ZPH)

Vin=11V (PQ090DNA1ZPH)

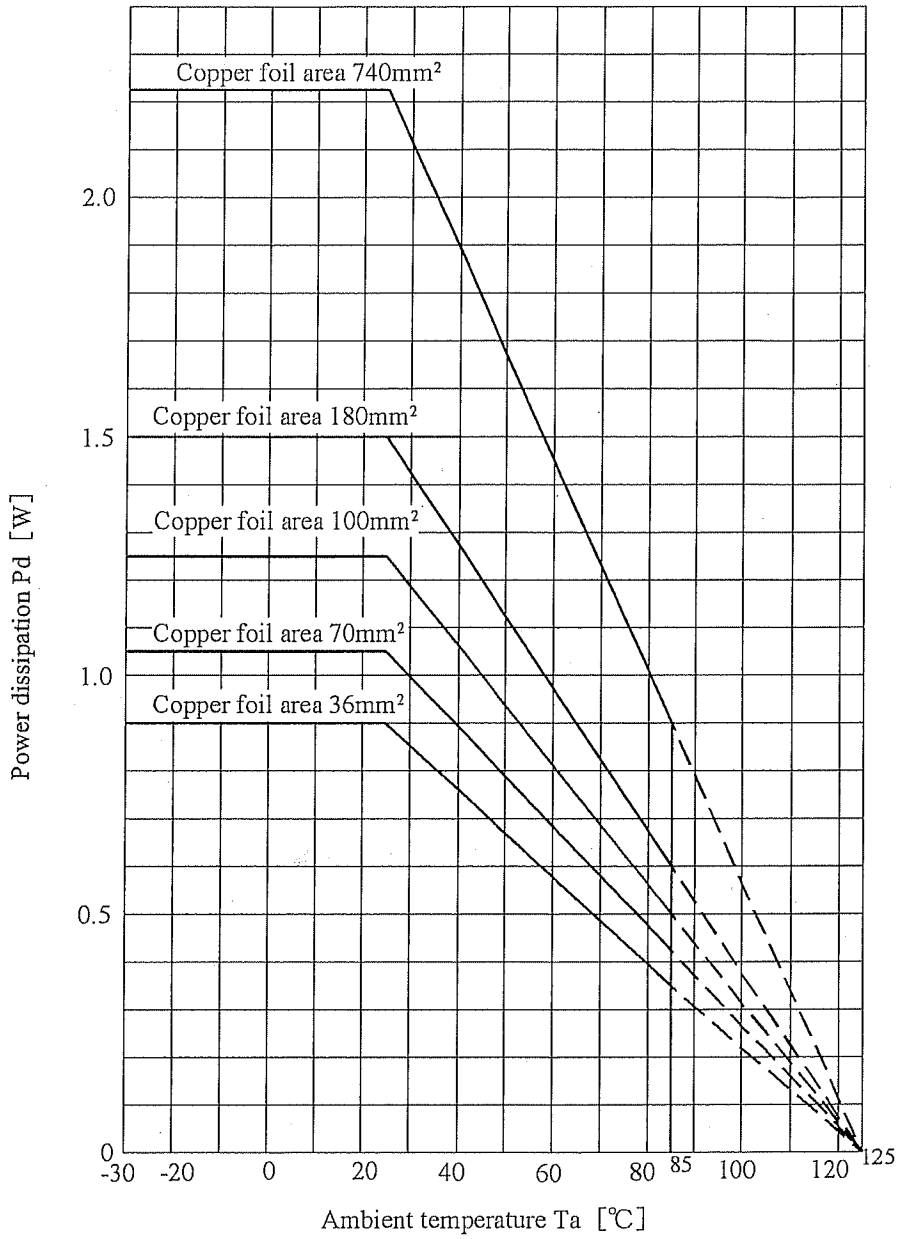
Vin=14V (PQ120DNA1ZPH)

Io=0.3A

RR=20 log {ei(rms)/eo(rms)}



3.4 Pd - Ta rating (Typical value)



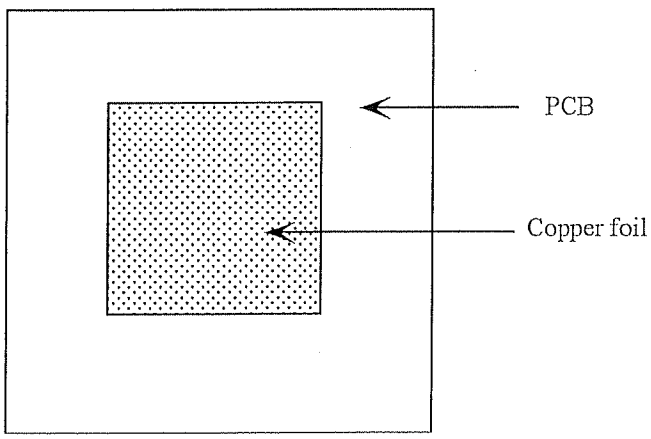
※The graph (power disspation vs.Ambient temperature) indicatesTj=125℃

Thermal design shall be considered in the safety operating area in the graph above.

Even though in the safety operating area,please consider thermal design well. In case of under insufficient thermal design or using by exceeding the safety operating area, there is possibility that this device does not operate well or the reliability may have bad affection.

In case of using by exceeding the safety operating area,this device will not work because overheat protection function will operate.

Mounting PCB



Material:Glass－cloth epoxy resin

Size:50×50×1.6mm

Thickness of copper foil :35 μm

4. Reliability

The reliability of products shall satisfy items listed below.

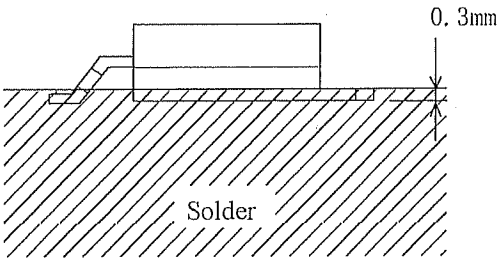
Confidence level : 90%

LTPD : 10 or 20

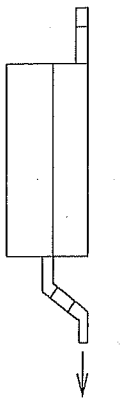
Test Items	Test Conditions	Failure Judgment Criteria	Samples (n) / Defective(C)
Temperature cycling	1 cycle -40℃(30min) to +150℃ (30min) 20 cycles test	Vo<L×0.8 Vo>U×1.2 RegL>U×1.2 RegI>U×1.2 RR<L×0.8 Vi-o>U×1.2 U: Upper specification limit L: Lower specification limit	n=22, C=0
Humidity (Steady State)	+60℃,90%RH, 1000h		n=22, C=0
Damp Heat cycling	1 cycle : -20℃(2h) to 70℃(2h) Transfer time between high and low temp. is 1h. 40 cycles test, 90%RH		n=22, C=0
High temp. storage	+150℃, 1000h		n=22, C=0
Low temp. storage	-40℃, 1000h		n=22, C=0
Operation life	Ta=25℃, Pd=0.8W, 1000h Mount on PCB copper foil area 36 ㎟ in Para.3-4.		n=22, C=0
Mechanical shock	15km/s^2, 0.5ms each 3 times/ ±X, ±Y, ±Z		n=11, C=0
Vibration (Variable frequency)	200m/s^2, 100 to 2000 to 100Hz/4 min each 4 times/ X, Y, Z direction		n=11, C=0
Soldering heat	260℃, 10 s, Dip it into solder to the position of 0.3mm from resin portion *2		n=11, C=0
Reflow Soldering heat	Temperature profile as shown in the item 7-4, twice.		n=11, C=0
Electrostatic discharge	±250V, 200pF, 0Ω Between GND and each terminal/ each 3 times		n=11, C=0
Robustness of Termination (Tensile test)	Weight: 5N 10 s/ each terminal *3	Failure if it has breakdown and loosened pin *4	n=11, C=0 n=11, C=0
Solderability	245±2ºC, 3s Solder : Sn/3.0Ag/0.5Cu EC19S TAMURA AKENCORPORATION made flux use *2	Failure if dipped portion area is not soldered 95% or more.. *5	n=11, C=0

*1 There are cases that heat sink and terminals will change their surface color.
The color change should be excluded from the failure judgment criteria.

*2 Soldering area is shown below.



*3 Terminal tensile direction is shown below.



*4 Except for the bending of terminal.

*5 Except for the portion within 0.3mm from the interface between the heat sink and the resin portion, the side and top surface of heat sink, and leads tiber cut portion.

5. Outgoing inspection

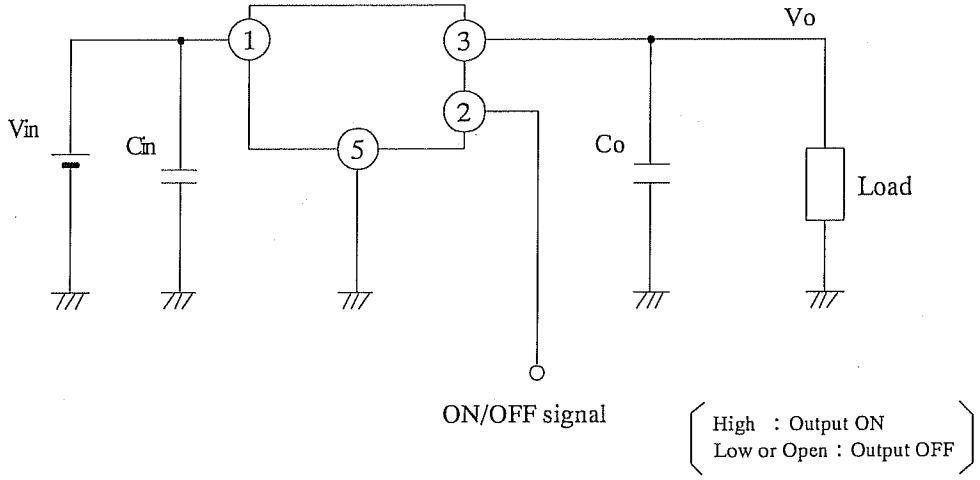
A single sampling plan, normal inspection level II based on ISO 2859 is applied

The AQL according to the inspection items are shown below.

Defect	Inspection items	AQL (%)	Judgment criteria
Major defect	Electrical characteristics	0.1	It is based on the contents in the specification.
	Marking		To be recognized.
Minor defect	Dimensions	0.4	It is based on the contents in the specification.
	Appearance		Having no resin break off and lead bending.

6. Supplement

6.1 Example of application



6.3 Packing specifications

6.3.1 Packing form

(1) Tape structure and Dimensions (Refer to Fig. A)

The carrier tape shall have a structure in which a cover tape is sealed heat-pressed on the carrier tape of polystyrene emboss protect against static electricity. Dimensions are shown in Fig. A.

(2) Reel structure and Dimensions (Refer to Fig. B)

The reel shall be made of polystyrene. Dimensions are shown in Fig. B.

(3) Direction of product insertion (Refer to Fig. C)

Product direction in carrier tape shall direct to the radiate fin of product at the hole side on the tape.

6.3.2 Tape characteristics

(1) Adhesiveness of cover tape

The peel-back force between carrier tape and cover tape shall be 0.1N to 0.8N for the angle 160° to 180° .
(Tape speed : 5mm/s)

(2) Bending strength

Sealed tape : Bended tape radius shall be 30mm or more.
If bended tape radius is less than 30mm ,there is case that cover tape come off carrier tape.

(3) Carrier tape : Bended tape radius shall be 5mm or more.

6.3.3 Rolling method and quantity

(1) Rolling method

Wind the tape back on the reel so that the cover tape will be outside the tape.
Attach 20 pitches or more of empty cavities to the trailer and attach 10 pitches or more of empty cavities to the leader of the tape and fix the both ends with adhesive tape.

(2) Quantity

Basically, one package shall contain 3000pcs.

6.3.4 Indication

(1) Reel

The label shall be pasted on the reel to indicate following contents.

* Model No. * Quantity * Packing date

(2) Package case

The label with below contents shall be pasted on the outer packaging case.

* Model No. * Quantity * Packing date

6.3.5 Storage environment

Taped products shall be stored at the temperature 5 to 30℃ and the humidity 70%Rh or less avoiding direct sunlight.
If taped products aren't used longer than for 10days, please rewind the tape pulled out and store.
Regarding the devices stored for long time, there is possibility that deterioration of lead pin color and solderability may be caused. Please use the devices after checking the solderability in advance.

6.3.6 Others

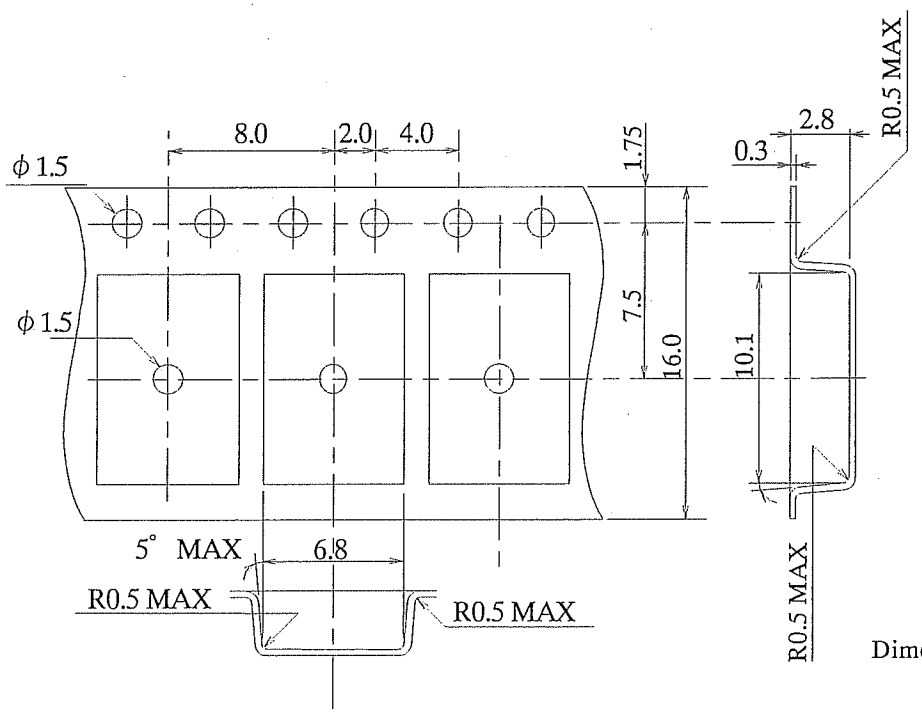
(1) Joint of tape

The cover tape and carrier tape in one reel shall be jointless.

(2) The way to repair taped failure devices

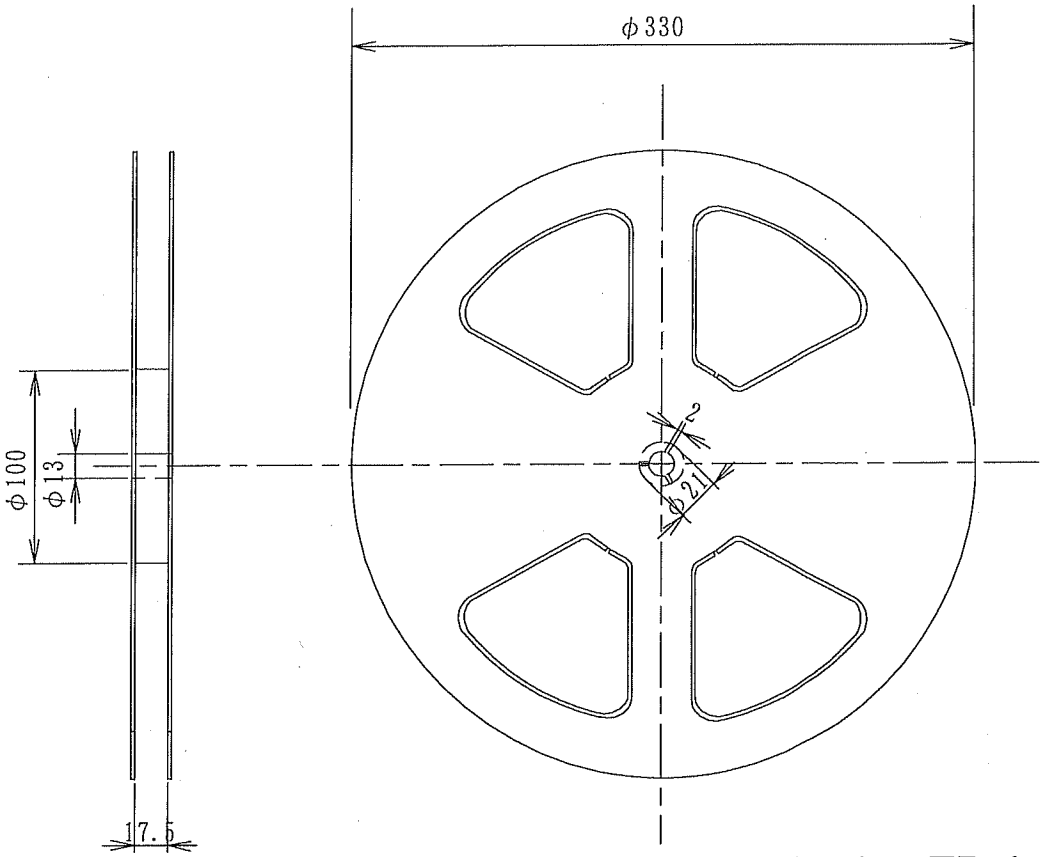
Cutting a bottom of carrier tape with a cutter, and after replacing to good devices, the cutting portion shall be sealed with adhesive tape.

Fig. A Tape structure and Dimensions



Dimensions : TYP. value
Unit : mm

Fig.B. Reel structure Dimensions



Dimensions : TYP.value
Unit : mm

Fig.C. Direction of product insertion

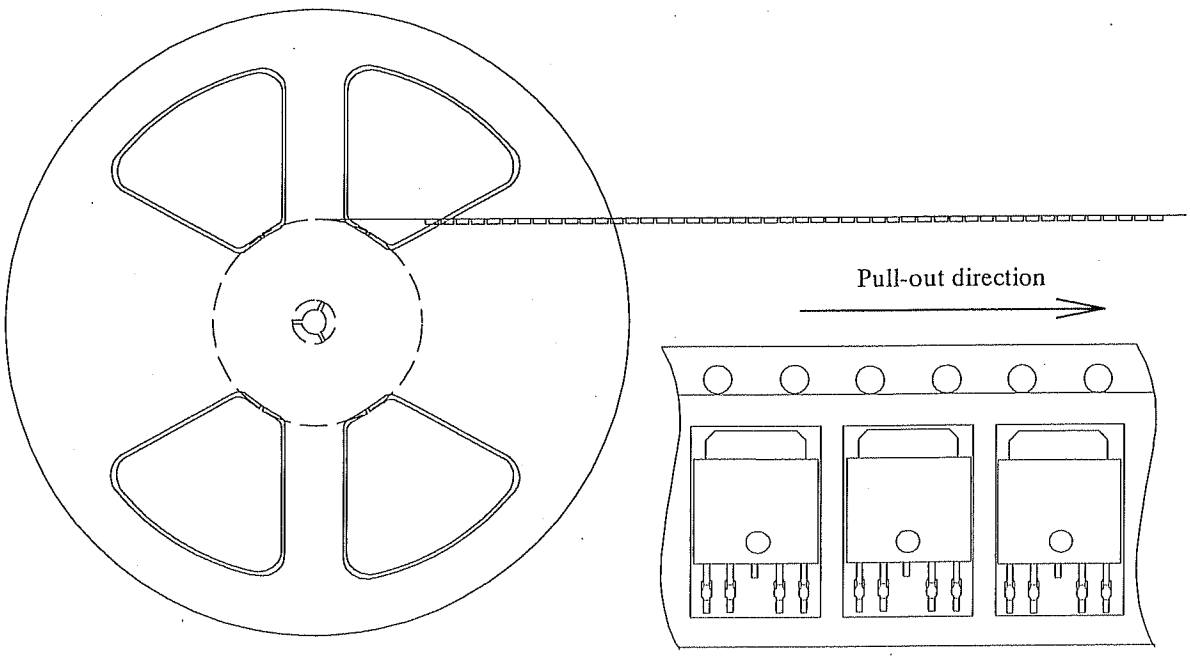
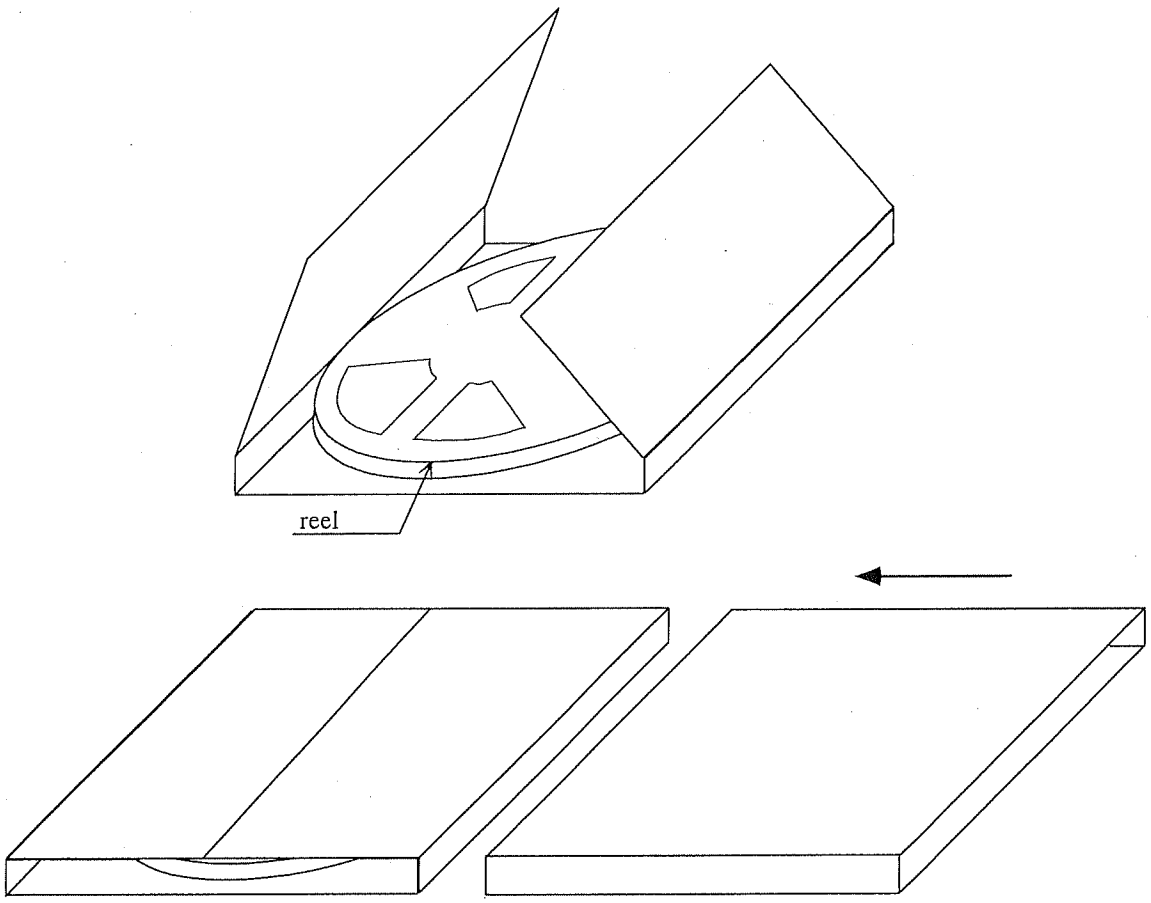
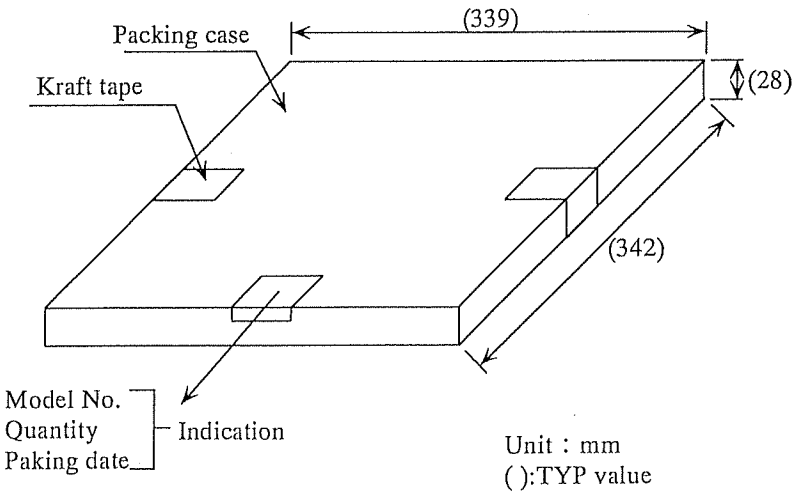


Fig.D. Packing case

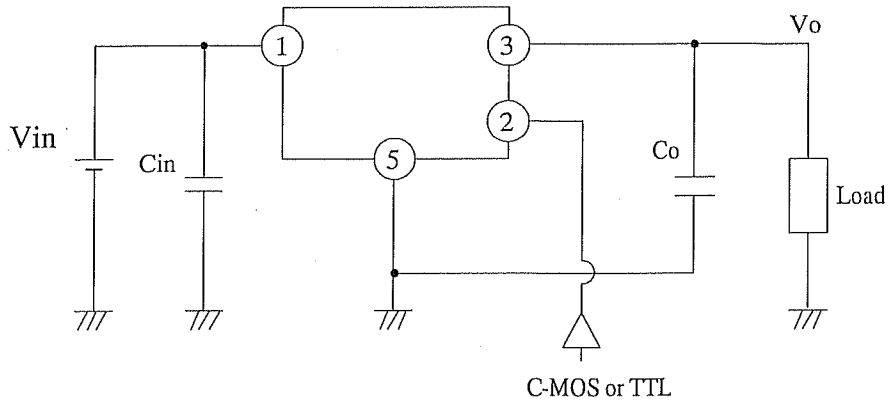




Unit : mm
( ):TYP value

7. Notes

7.1 External connection

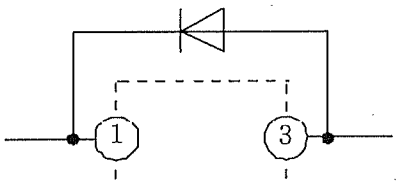


(1) Please use Cin and Co for sure to use this device.
For Co,the ceramic capacitor of 10 μF or more with B characteristics is recommend.
Please design the shortest wiring for connection between Cin, Co and the individual terminal.
There is case that oscillation occurs easily by kinds of capacitor and capacity.
Before you use this device, you should confirm output voltage on your use mounting state.

(2) The input terminal for ON/OFF output control ; ② is compatible with LS-TTL, and direct driving by TTL or C-MOS standard logic (RCA 4000 series) is also available. In case that ON/OFF terminal is not used, we recommend to connect the ON/OFF terminal directly to the input terminal ; ① input voltage.

(3) Voltage application under conditions that the device pin is inserted divergently or reversely may cause the degradation of characteristics or breakdown of the device, please avoid it absolutely.

(4) In applying greater voltage to the output terminal ③ than the voltage of the DC input terminal ①, breakdown of the device may occur. Especially in the case that the DC input terminal ① is short-circuited with GND, under the normal condition, the charge that is being charged into the output capacitor (Co) flows into the input side.
This may cause breakdown of the device.
To prevent such a breakdown, please connect a silicon diode as shown below in the schematic



7.2 Thermal protection design

The internal power dissipation (Pd) of device is obtained by the following equation.

$$Pd = Io \times (Vin\text{-}Vo) + Vin \times Iq$$

When the maximum operating temperature (Ta) and Pd (MAX.) under the device operation are determined, please do the design the sufficient heat radiation to operate the device within the safety operation area specified by the derating curve in para. 3.4.

Insufficient radiation or using over the limitation of the inner power dissipation curve gives an unfavorable influence to the normal operation and reliability of the device. When deviating from the safety operational territory illustrated by the derating curve, the overheat protection circuit operates to let output fall down, please avoid keeping such condition for a long time.

7.3 Static electricity

Good caution must be exercised against static electricity since this device consists of a bipolar IC.
Following are some examples of preventive measures against excessive voltages such as caused by static electricity.

(a) Human body must be grounded to discharge the static electricity from the body or cloth.
(b) Anything that is in contact with the device such as workbench, inserter or measuring instrument must be grounded.
(c) Use a solder dip basin with a minimum leak current (isolation resistance 10 MΩ or more) from the commercial power supply. Also the solder dip basin must be grounded.

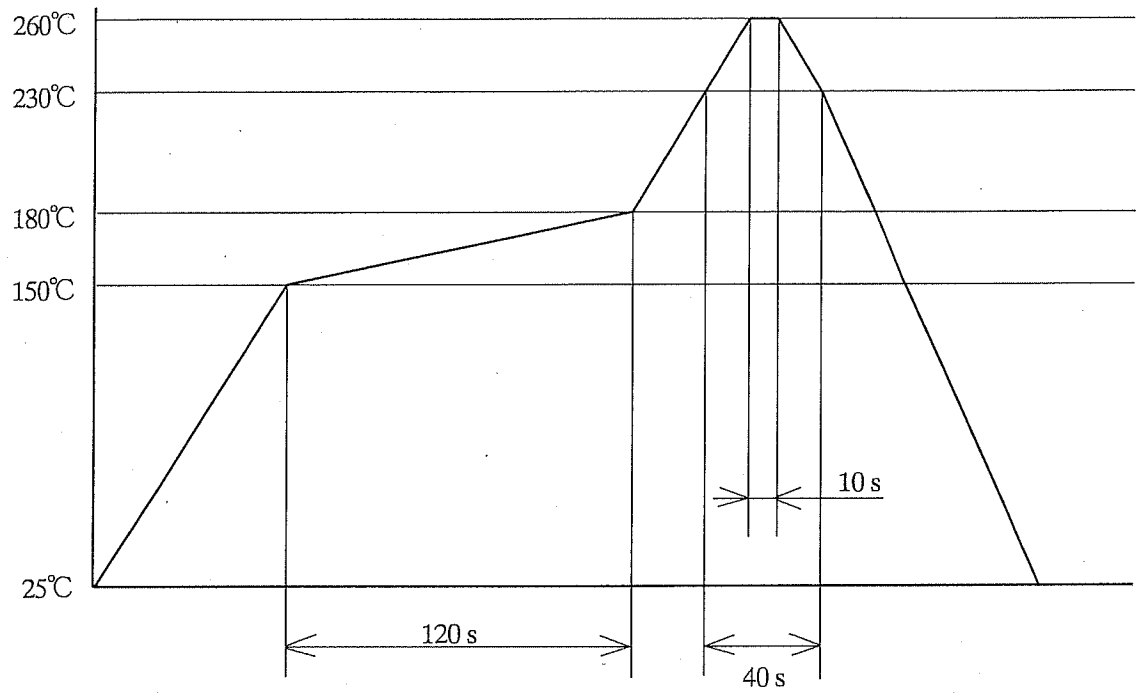
7.4 Soldering

(1) Reflow soldering

Soldering be done two times or less at the temperature
and the time within the temperature profile as shown in the figure.
(The temperature shown in the figure is fin portion temperature of the device.)
It is recommended that the second start after is the temperature of the device become to the room temperature.
Please obey the note items below concerning solder reflow.

(a) An infrared lamp used for soldering may cause a localized temperature rise in the resin.
The temperature of resin portion should be with in the temperature profile below.

(b) The temperature gradient when soldering-reflow is 4℃/s or less.



(2) Dip soldering

We recommend that solder dip should be 260℃ or less (Solder temp.) within 10s and 1 time only.
Please obey the note items below concerning solder dip.

(a) After solder dip, please do cooling naturally.

(b) Please do not give the mechanical force or the impact force to the device during natural cooling.
In advance, please confirm fully the dip soldering conditions etc. of the actual use in order to avoid any soldering bridge.

(3) Hand soldering

This device is basically designed for the soldering such as reflow soldering or dip soldering.
In case when hand soldering is reluctantly needed for modification etc.
Only one hand soldering should be done at 350℃ or less of soldering iron edge temperature, for 10s or less. Please be careful not to touch soldering iron edge to leads directly etc. in order not to give any force to the leads.
Please be careful, especially, when heat sink is heated up by soldering iron, there is possibility that internal device may have over heat and the reliability of the internal device may have bad affection.

Even if the above conditions regarding solder reflow, solder dip or hand soldering there is the possibility that the force given to the terminals by the deformation of PCB may cause the electric properties change and wire breaking in the device package. In advance, please confirm fully at the actual application.

7.5 Cleaning

(1) Solvent cleaning : Solvent temperature 45℃ or less
Immersion for 3 min or less

(2) Ultrasonic cleaning : The effect to device by ultrasonic cleaning differs by cleaning bath size, ultrasonic power output, cleaning time, PCB size or device mounting condition etc.
Please test it in actual using condition and confirm that doesn't occur any defect before starting the ultrasonic cleaning.

(3) Applicable solvent : Ethyl alcohol, Methyl alcohol, Isopropyl alcohol
When the other solvent is used, there are cases that the packaging resin is eroded.
Please use the other solvent after thorough confirmation is performed in actual using condition.