

REFERENCE SPECIFICATION

1. **STRUCTURE**
Single inline package
2. **PRODUCTS**
Power module
3. **TYPE**
BP5723-33
4. **APPLICATION**
Communication devices, Home appliances, Industry machine
5. **FUNCTION**
Insulation switching regulator.

Item	Standard	Remarks
Primary-Secondary Distance	7.0mm OVER	
Opto-coupler authorization standard	UL	UL1577 No. E67349
	BSI	BS EN60065: 1994 BS EN60950: 1992
	SEMKO	EN60065、EN60950、EN60335
	TUV	DIN VDE0884

6. **ABSOLUTE MAXIMUM RATINGS**

(Ta=25°C)

NO	Parameter	Symbol	Limits	Unit	Conditions
1	11 pin input voltage	VD	700	V	
2	7 pin input voltage	VDD	25	V	
3	11 pin input currents	ID	500	mA	PEAK
4	8 pin input currents	IDD	10	mA	
5	Maximum output power	Po	10	W	
6	Withstanding voltage	VI	3.0	KV	1sec (Primary-Secondary)
7	Permission temperature	Tcmax	105	°C	Contain a self-fever
8	Operating temperature range	Topr	-25 ~ +80	°C	
9	Storage temperature range	Tstg	-30 ~ +105	°C	

UNCONTROLLED

DESIGN	CHECK	APPROVAL	DATE:15/OCT/2004	SPECIFICATION No. : BP5723-33-A-001-E(Lead Free)
T. Sakamoto	H. Hayashi		REV. A	ROHM CO., LTD.

7. ELECTRICAL CHARACTERISTICS

A case without designation: $T_a=25^{\circ}\text{C}$, $V_{in}=141\text{V}$, $I_o=2.0\text{A}$

NO	Parameter	Symbol	SPEC			Unit	Test circuit	Conditions
			Min.	Typ.	Max.			
1	11pin Input voltage	VD	-	-	650	V	Fig. 1	$I_o=3.0\text{A}$
2	Supply voltage (7pin)	VDD	8.5	14	20	V	↓	$I_o=1.0\text{A}$, note 1)
3	Output voltage	V_o	3.13	3.3	3.47	V		
4	Output current	I_o	0	-	3.0	A		Refer to derating curve
5	Line regulation	V_r	-	10	200	mV		$V_{in}=113\text{V}\sim 374\text{V}$
6	Load regulation	V_l	-	10	200	mV		$I_o=0\text{A}\sim 2.0\text{A}$
7	Output ripple	V_p	-	100	500	mVpp		note 2)
8	Efficiency	η	70	79	-	%		$I_o=3.0\text{A}$

note 1) Operation start voltage becomes for 16V~18V.

note 2) Pulse noise does not include it.

8. TEST CIRCUIT

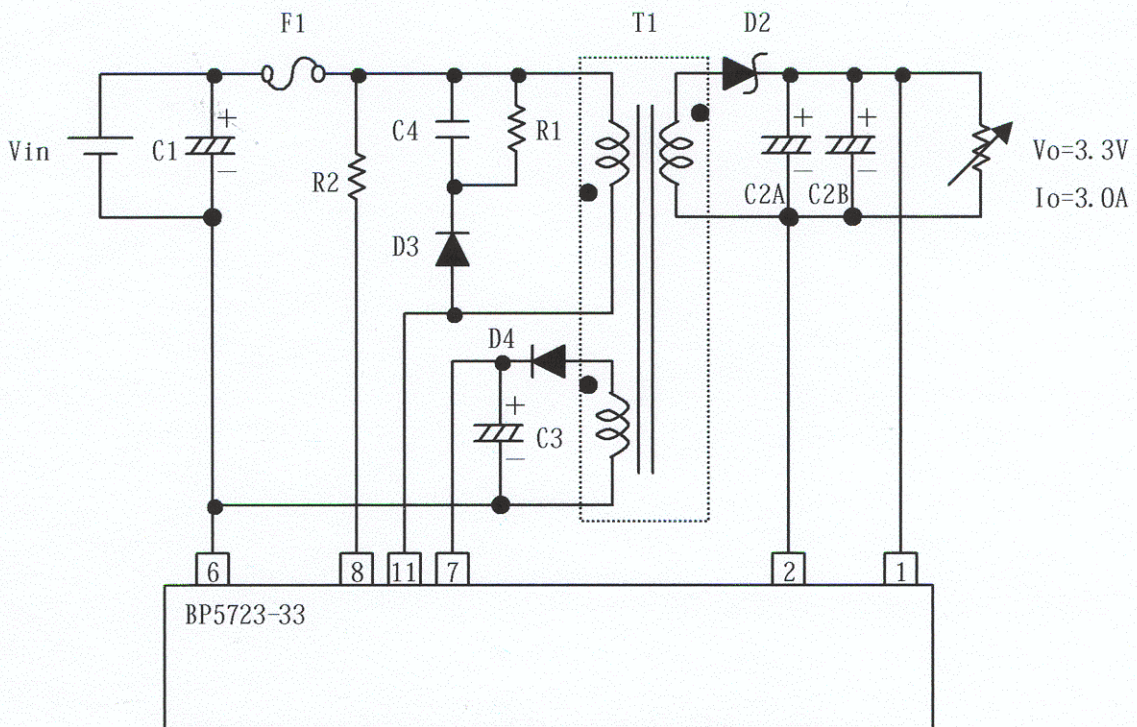


FIG. 1 TEST CIRCUIT

※ Use part refers to the application circuit example

9. Transformer specification

Reference specification

Transformer specification	SRW19LES-X81H015
AL-Value	100 (nH/N ₂)
L _p	1.9mH±20%
L(leak)	110uH MAX

No	Coil	端子	Terminal	Wire	Winding method
1	NP1	8-9	69	1 UEW 0.2	FIT
2	Ns1	4-1	6	1 UEW 0.35×3	FIT
3	ND	6-7	22	1 UEW 0.2×2	FIT
4	Ns1'	5-2	6	1 UEW 0.35×3	FIT
5	NP2	9-10	69	1 UEW 0.2	FIT

Please design the transformer design so that the maximum surface temperature of the module becomes below 100°C without fail under a real use condition.

Please wind the ND roll line as the connection becomes bad as much as possible.

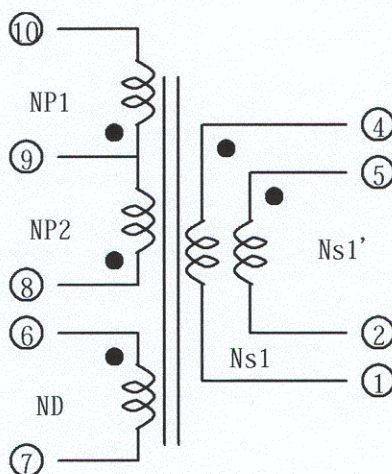
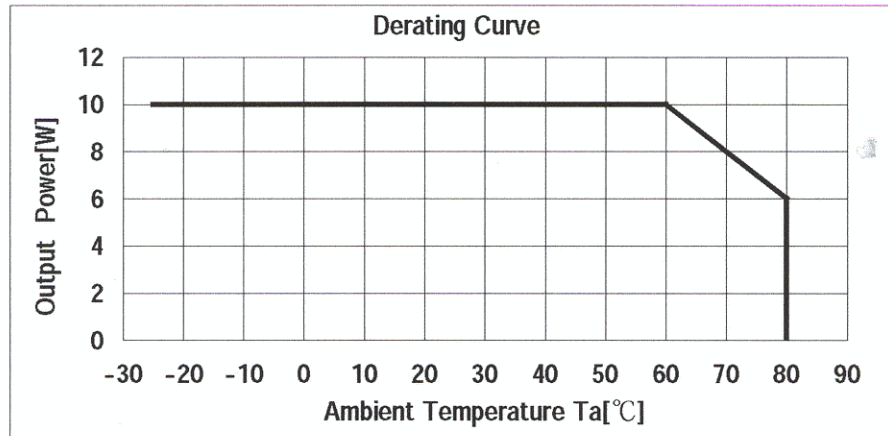


FIG. 2 SRW19LES-XXXH015 Winding specification

10. Derating curve

Maximum output current must be reduced by ambient temperature. Be sure to use it in the following derating curve.



GRAPH1. Derating curve

A department of the module IC to give off heat most isn't to exceed 100 degrees in the total with a self-fever and ambient temperature.

And, ambient temperature becomes the department of the module IC where the part of the slant line gives off heat most in 25 degrees.

If, the reliability of the module IC is likely to be made to decrease when it is used under the condition that surface temperature of the module IC exceeds 100 degrees.

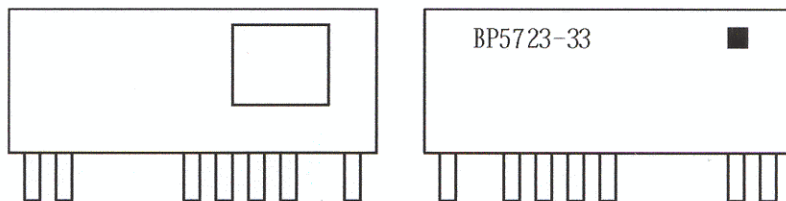
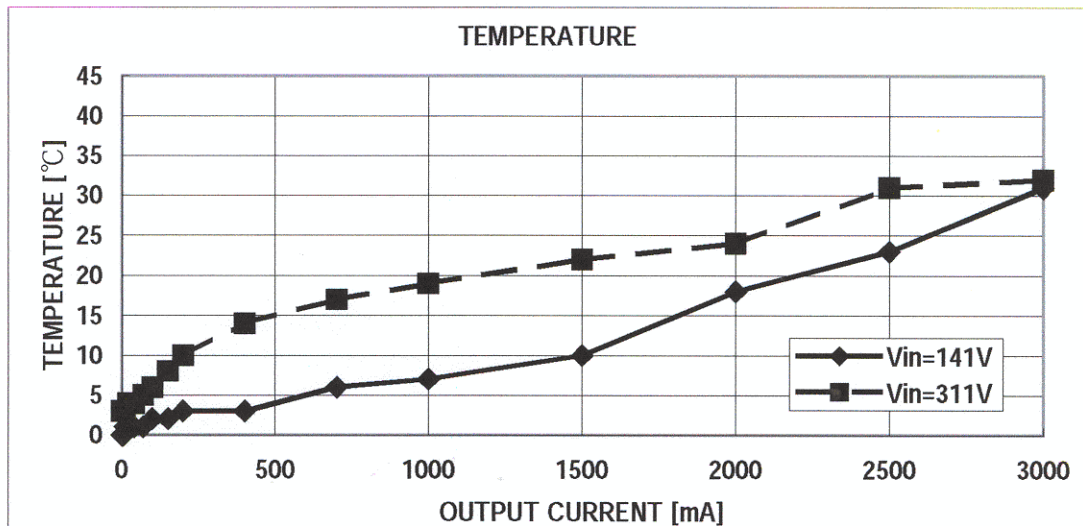


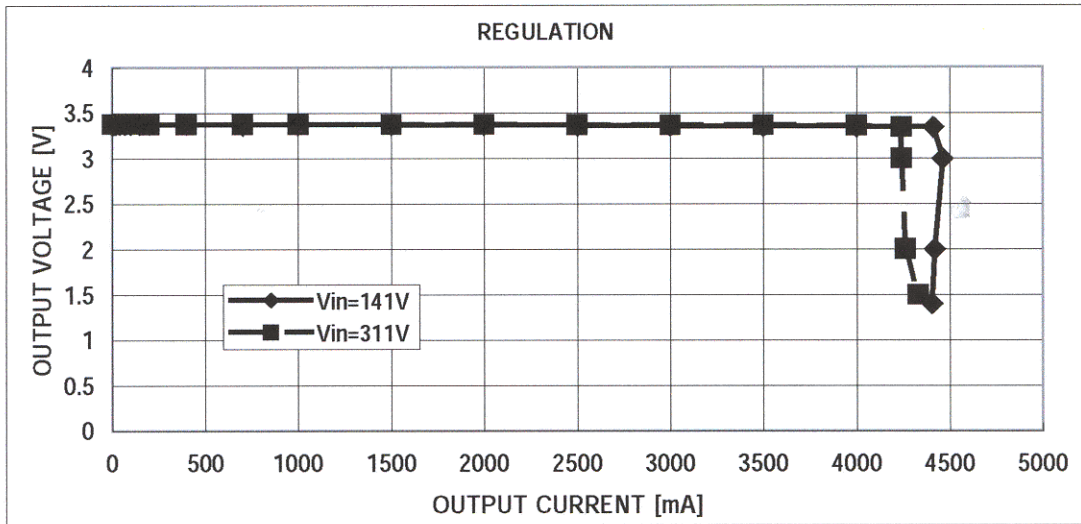
FIG.3 The highest generation part



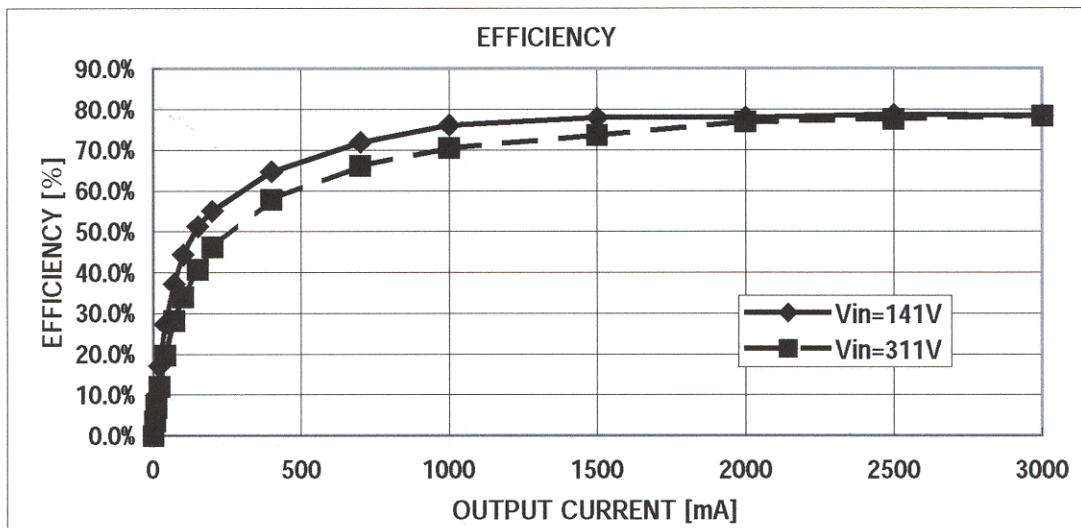
GRAPH.2 Temperature rise curve

11. ELECTRICAL CHARACTERISTICS GRAPHS (Ta=25°C)

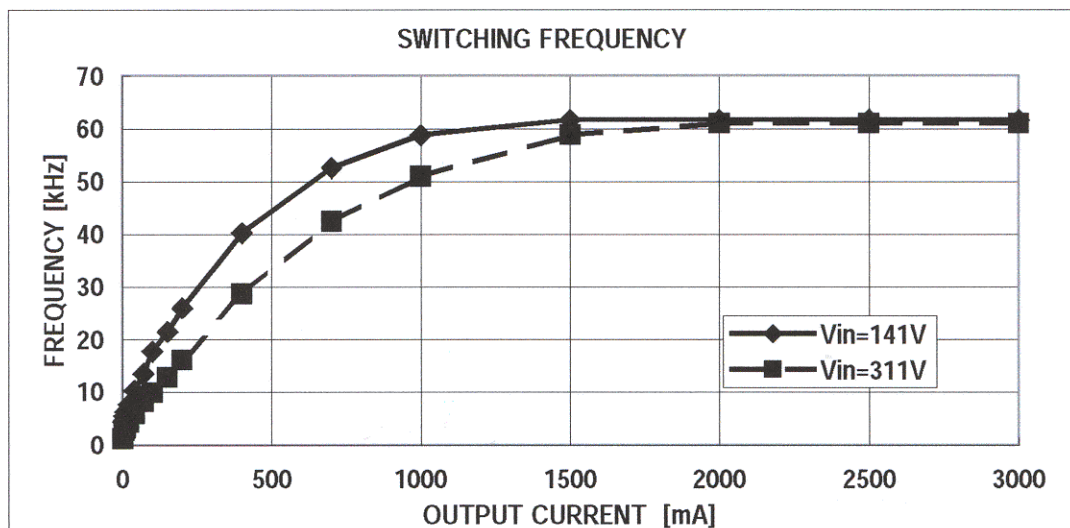
Reference data



GRAPH. 3 Load regulation



GRAPH. 4 Efficiency



GRAPH. 5 Switching frequency

12. Dimension (UNIT:mm)

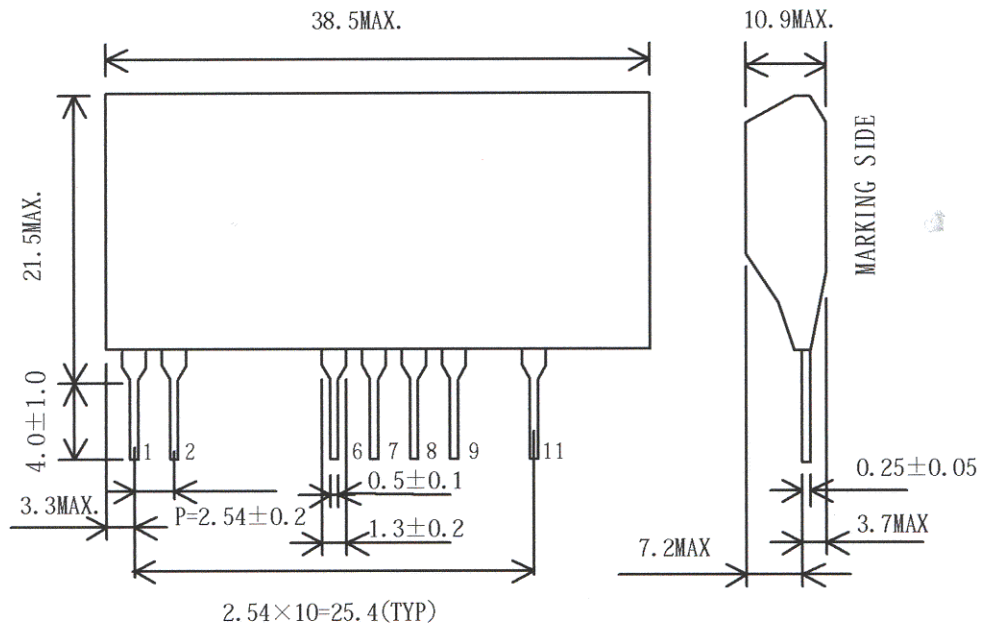


FIG. 4 Dimension

Marking

■	Pin No. 1 Mark
ROHM	Trade mark
BP5723-33	Type name
0405S	Production Lot Number
	5th week of 2004
	S : ROHM DALIAN
	Without S : ROHM AMAGI

- An appearance regulation is the standard specification of ROHM.
- The pinhole makes the excellent article to the $\Phi 1.5$ mm.

13. TERMINAL FUNCTION

Pin No	Name	Terminal function
1	Vo	Secondary output voltage control terminals.
2	GND	GND terminals for the Secondary side output.
6	Vin(-)	The primary side input minus terminal.
7	VDD	The power supply terminal of an inside circuit.
8	Vs	Triggering terminal.
9	NC	NC pin
11	VD	It is the drain terminal of inclusion FET.

14. Application circuit

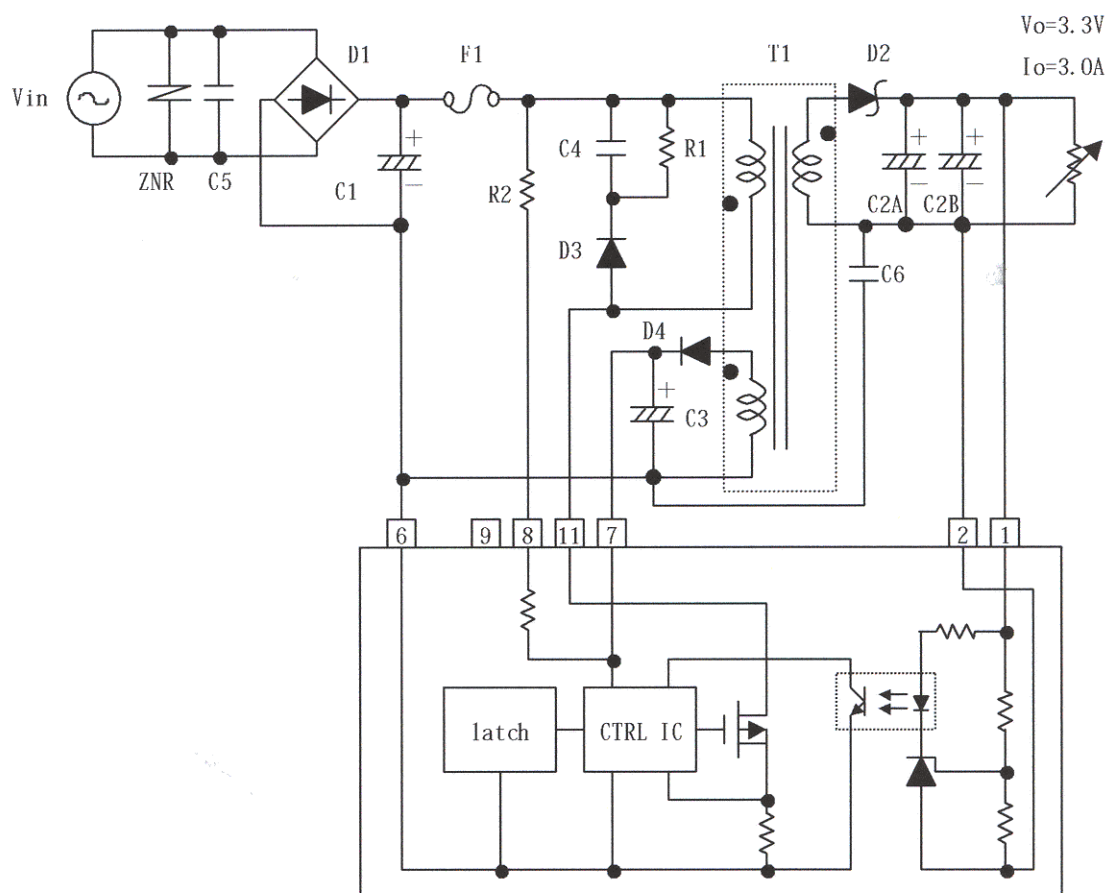


FIG.5 Application circuit

15. Application circuit use part example

Sign	Type	Character	Reference part
C1	Input capacitor	33 μ F / 450V	Nichicon VR series
C2A C2B	Output capacitor	560 μ F / 10V High polymer aluminum solid condenser	SANYO SEP series
C3	Output capacitor	10 μ F / 50V Low impedance type	Nichicon PJ series
C4	noise removal capacitor	4700pF / 1kV	Matsushita
C5	noise removal capacitor	As occasion demands attach it	
C6	noise removal capacitor	As occasion demands attach it	
D1	Diode bridge	-----	Shindengen
D2	Shotkey diode	30V/15A	ROHM RSX1501T3
D3	Rectification diode	1kV/1A	TOSHIBA 1S1830
D4	Rectification diode	80V/0.13A	ROHM 1SS133
R1	Resistance	47k Ω \pm 5% 3W DC300V over	
R2	Resistance	1.5M Ω \pm 5% 0.25W 750V over	
T1	Switching transformer	Custom	TDK SRW19LES
F1	Fuse	Be sure to use a fuse for the safety.	
ZNR	Varistor	Be sure to use it to protect this product from thunder surge and the static electricity.	

16. Operation principle

This module is able to compose the power supply easily by establishing the transformer and rectification circuit to bill outside.

Voltage occurs to the VDD terminal, from the triggering resistance that was connected.

This module begins to act, when the VDD terminal reaches 16V.

Output voltage occurs on the secondary sides, when this module starts switching.

At this time, stabilizing even the VDD terminal simultaneously even output voltage stabilizes.

An excessive current (the return style) excessive voltage (the latch style) the protection function is built as, the protection function and prevent the destruction in a sudden abnormal time.

An excessive voltage protection action goes up even VDD voltage as the voltage of output Vo goes up, in the case that the output voltage control stopped working.

In the case that this VDD voltage became 20V over the latch circuit acts and output stops.

Cancellation returns with the power supply input, after the condenser for input evenness is discharged.

These protection functions are an effective thing to the destruction prevention by a sudden accident and please avoid use a continuous protection circuit action, passage at the time of with.

17. Attention on operating

- VDD terminal voltage may become off voltage (8.5V less) before the ND volume line voltage of the transformer becomes effective, in the case that the capacity of the secondary condenser is big at the time of power supply triggering.

In this case, there is the possibility that the VDD terminal oscillates and relaxes.

Raise the capacity of electrolysis condenser 10μF for VDD, to do the faulty the measure or please decrease the capacity of the secondary condenser.

- In the case that the capacity of the output electrolysis condenser is enlarged output stands normally and may not rise.

The recommendation makes 560 μF~2200 μF. Give start-up time as 10msec within.

- Give the electrolysis condenser for VDD as 10μ F.

the power supply may not act when it makes the capacity of small of the condenser.

Triggering time is

$$t(\text{sec}) \doteq -R_2 \times C_3 \times \ln\left(1 - \frac{17}{V_{in} - (30 \times 10^{-6} \times R_2)}\right)$$

- Please use VDD terminal voltage within the action voltage range without fail. When the upper limit is exceeded excessive voltage protection works and may stop and may output. Also UVLO does the work restarting when the minimum is fallen below.

18. RECOMMENDATION LAYOUT

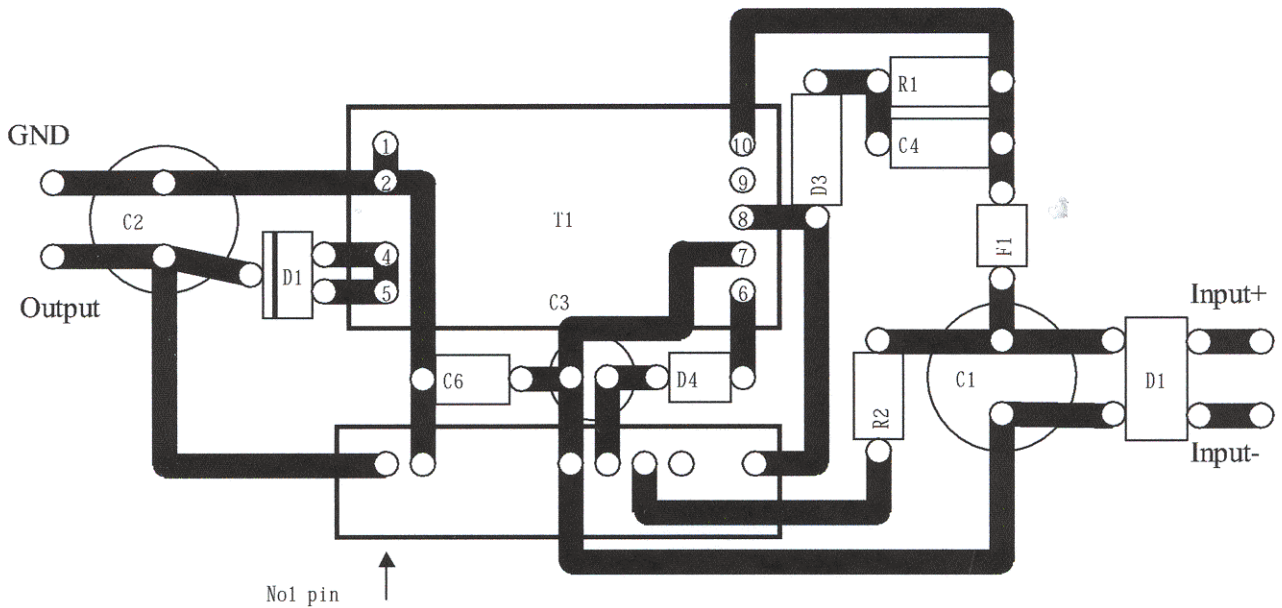


FIG. 6 RECOMMENDATION LAYOUT

- Primary-Secondary Distance of the inside this module is securing 7.0 mm. This is because it corresponds to the strength insulation of IEC60950. Accordingly, please do so that Primary-Secondary Distance and also space distance are secured sufficiently on the occasion of pattern layout.
- Shotkey diode D1 of output accompanies big generation that it depends on the load condition. Please consider it so that this diode selects the good thing of the characteristic sufficiently and also be easy to radiate heat.

19. FOR PACKING

Packing the product in the packing tray it ships it.

The quantity are 24pcs×5 steps = 120pcs.

The accumulation step number and also packing structure may change nonexistent it notice by the shipment quantity.

20. MANUFACTURE FACTORY

ROHM AMAGI CO.,LTD. (JAPAN, FUKUOKA)

ROHM ELECTRONICS DALIAN CO.,LTD. (CHINA)

21. STRUCTURE

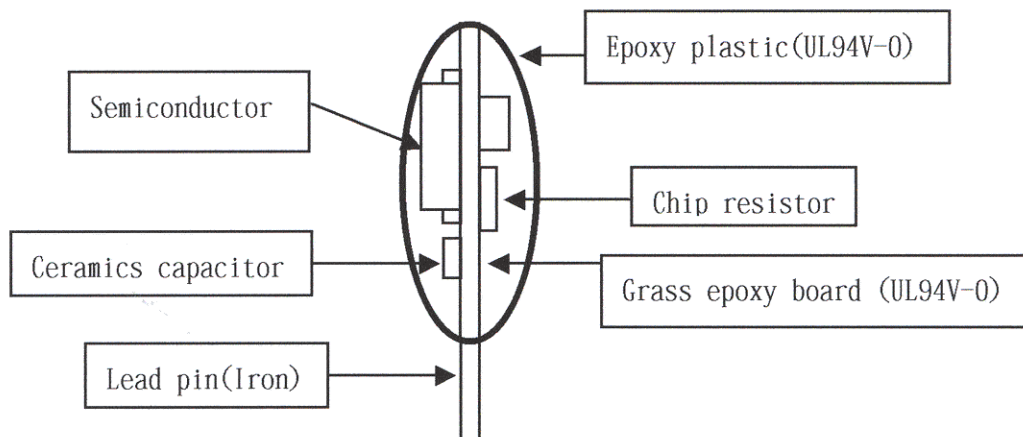


FIG.7 Structure

Soldering condition	Flow soldering	260℃、within 10sec
	Manual soldering	380℃、within 3sec
Cleaning condition	Washing liquid	Water or alcohol
Land dimension	Hole diameter	0.9mm
	Land diameter	2.0mm