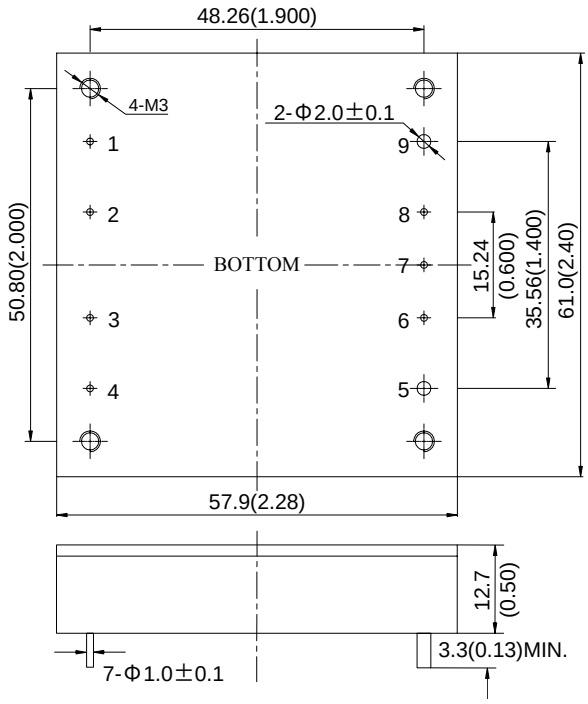
YHD Series Converter

RoHS 2002/95/EC

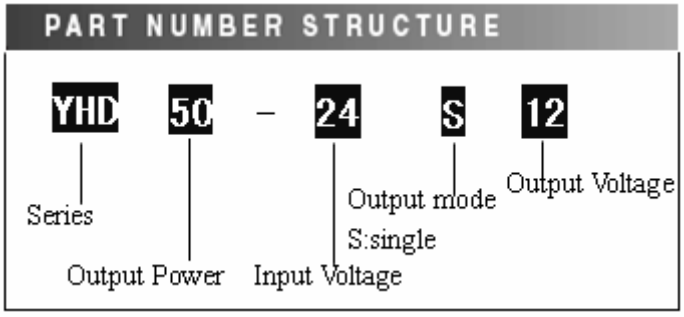
Outline Diagram



Features

- Half-Brick（61.0mm×57.9mm×12.7mm）
- Positive Logic, Remote on/off
- Input Under voltage Protection
- Output Current Limit Protection(OCP)
- Output Over Voltage Protection(OVP)
- Over Temperature Protection (OTP)
- Output Voltage Adjust Range:±10 % of the rated output voltage
- Output Short-circuit Protection, hiccup, auto-recovery
- 1500Vdc Isolation Voltage(Input to output)

Pin	Symbol	Function
1	-Vin	Negative Input
2	CASE	Connect to the baseplate
3	CNT	Remote Control Pin
4	+Vin	Positive Input
5	+Vo	Positive output
6	+S	Positive Remote Sense
7	TRIM	Output voltage adjust
8	-S	Negative Remote Sense
9	-Vo	Negative Output



Performance Specifications And Ordering Guide

Unless otherwise specified, all values are given at: 25℃, one standard atmosphere pressure, pure resistive load and basic connection.

Model	Output				Input	Efficiency
	Voltage(V)	Current(A)	Ripple and Noise(mV)	Capacitive load(uF)	Range-DC (Volts)	
YHD50						
YHD50-24S12	12	4.2	100	3300	18~36	86%
YHD50-24S15	15	3.3	100	2200	18~36	86%
YHD50-24S48	48	1.1	240	470	18~36	86%

YHD50-48S12	12	4.2	100	2200	36~72	87%

Continue

Model	Output				Input	Efficiency
	Voltage(V)	Current(A)	Ripple and Noise(mV)	Capacitive load(uF)	Range-DC (Volts)	
YHD50						
YHD50-48S15	15	3.3	150	2200	36~72	87%
YHD50-48S24	24	2.1	150	1000	36~72	87%
YHD50-110S12	12	4.2	150	1000	66~160	86%
YHD50-110S15	15	3.3	150	1000	66~160	86%
YHD50-110S24	24	2.1	150	1000	66~160	86%
YHD50-110S48	48	1.1	200	470	66~160	86%
YHD75						
YHD75-24S12	12	6.3	100	4700	18~36	86%
YHD75-24S15	15	5.0	100	3300	18~36	86%
YHD75-24S24	24	3.1	150	2200	18~36	86%
YHD75-48S12	12	6.3	100	4700	36~72	87%
YHD75-48S24	24	3.1	150	2200	36~72	87%
YHD75-48S28	28	2.67	200	1000	36~72	88%
YHD75-110S12	12	6.3	150	1000	66~160	85%
YHD100						
YHD100-24S12	12	8.3	100	4700	18~36	86%
YHD100-24S24	24	4.2	150	2200	18~36	86%
YHD100-48S12	12	8.3	100	4700	36~72	87%
YHD100-48S24	24	4.2	150	2200	36~72	88%
YHD100-48S48	48	2.1	200	470	36~72	87%
YHD100-110S12	12	8.3	150	2200	66~160	86%
YHD100-110S15	15	6.7	150	2200	66~160	86%
YHD150						
YHD150-24S12	12	12.5	100	4700	18~36	86%
YHD150-24S15	15	10	150	3300	18~36	86%
YHD150-24S24	24	6.3	150	1000	18~36	86%
YHD150-24S48	48	3.1	200	470	18~36	86%
YHD150-48S12	12	12.5	200	470	36~72	87%
YHD150-48S24	24	6.3	150	2200	36~72	87%
YHD150-48S48	48	3.1	200	470	36~72	87%
YHD150-110S12	12	12.5	150	4700	66~160	87%
YHD150-110S24	24	6.3	200	2200	66~160	87%
YHD150-110S48	48	3.2	300	470	66~160	87%
YHD200						
YHD200-24S12	12	16.7	150	2200	18~36	87%
YHD200-24S15	15	13.3	150	2200	18~36	88%
YHD200-24S24	24	8.3	200	1000	18~36	89%
YHD200-24S48	48	4.2	300	470	18~36	87%
YHD200-48S12	12	16.7	150	2200	36~72	90%
YHD200-48S24	24	8.3	200	1000	36~72	90%
YHD200-48S28	28	7.4	200	1000	36~72	92%
YHD200-48S48	48	4.2	200	470	36~72	88%

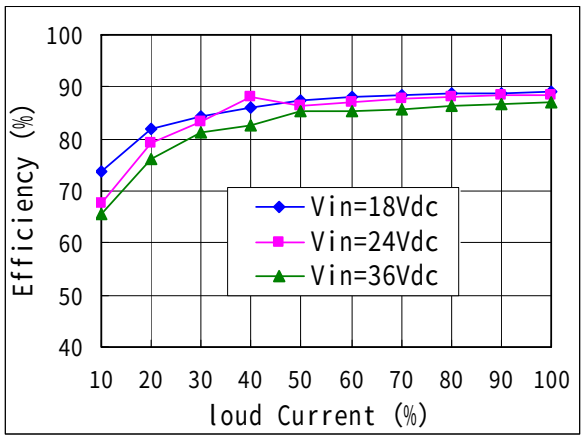
Performance/Functional Specifications

Input		
Input Voltage:		See Ordering Guide
Romote Control: (Refer to –Vin)	On Off	Logic High Logic Low
Input Under Voltage Protection:		See Respective Data Sheet
Output		
Voltage Accuracy:		±1% max
Trim Range:		±10% max
LineRegulation:		±0.2%max
Load Regulation:		±0.5% max
Ripple and Noise:		See Ordering Guide
Efficiency:		See Ordering Guide
Dynamic Response:		5%Vo PK deviation (50~75% load) 200uS setting time (50~25% load)
Start-up Delay Time:		See Respective Data Sheet
Rise Time:		See Respective Data Sheet

General	
Isolation Voltage:	1500Vdc /1min/1mA (Input-Output) 1050Vdc /1min/1mA (Input-Case) 500Vdc /1min/1mA (Output- Case)
Switching Frequency:	300kHz(typ)
MTBF：	1.5×10^6h(Bellcore RT332, 25℃)
Temperature Coeffcient:	±0.02% per℃
Baseplate Temperature:	-40℃～+100℃(Industry)
Storage Temperature:	-55℃～+105℃
Relative Humidity:	10%~90%
Over Temperature Protection:	100-120℃
Short-circuit Protection:	Hiccup mode, automatic recovery
Isolation Resistance:	50 MΩmin (500Vdc,90%RH)
Manual Soldering:	425℃max (5s Max)
Wave Soldering:	260℃max (10s Max)
Weight:	70~80g

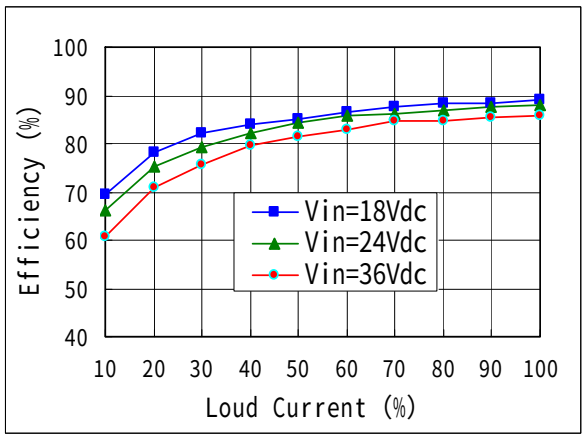
Characteristic Curves

Efficiency



YHD50-24S12

Efficiency



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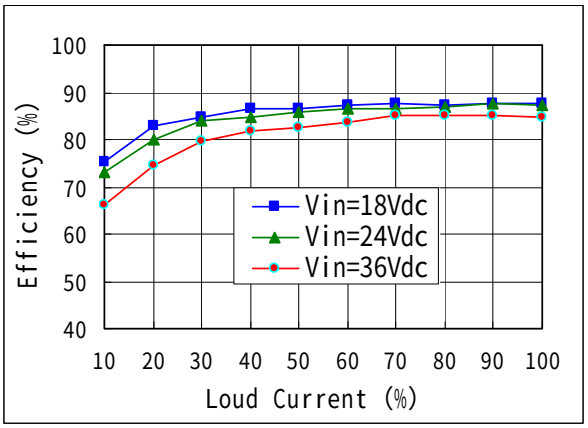

YHD50-24S48

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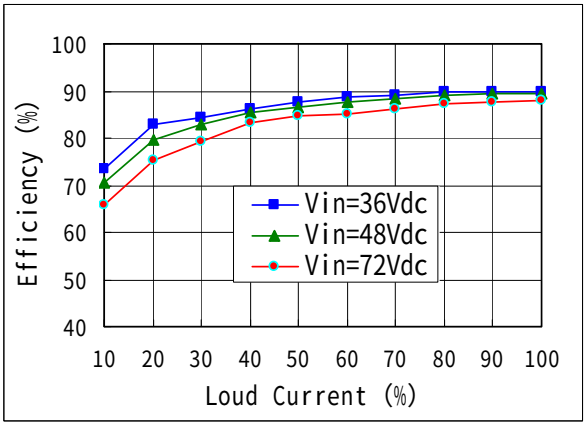

YHD50-48S12

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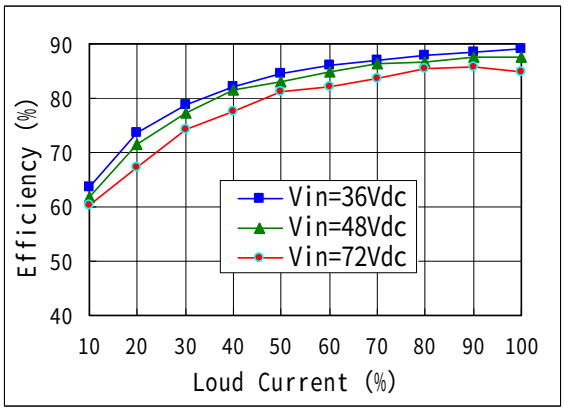

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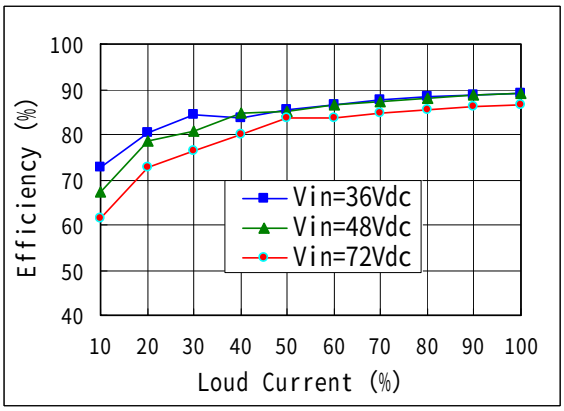

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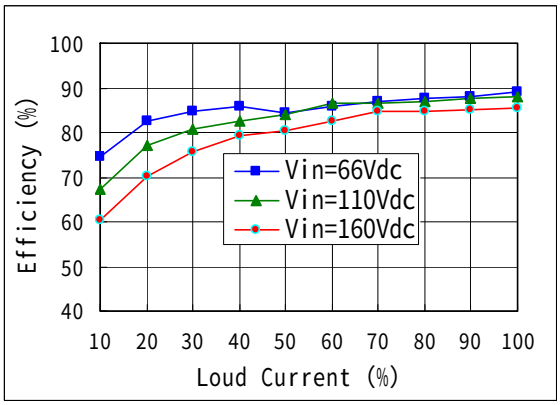

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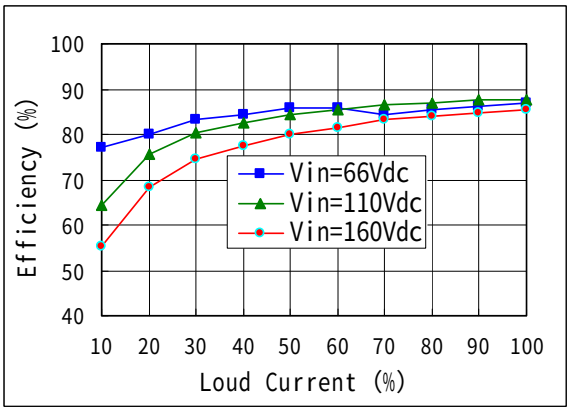

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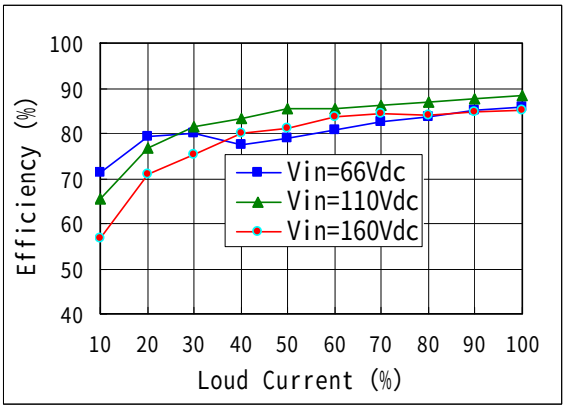

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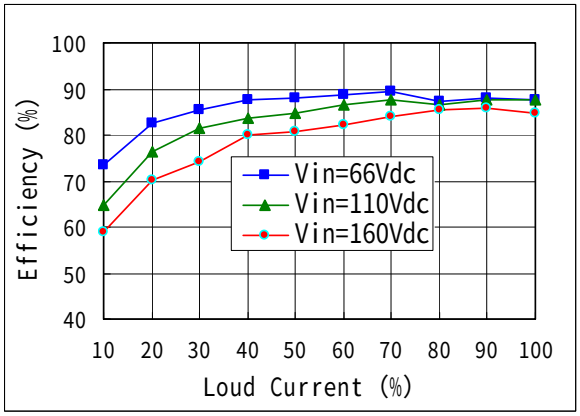

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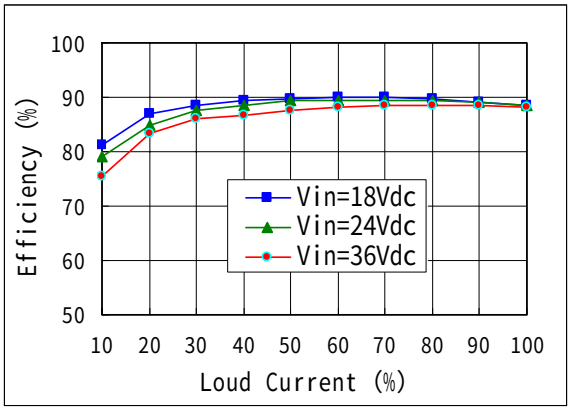

YHD75-24S12

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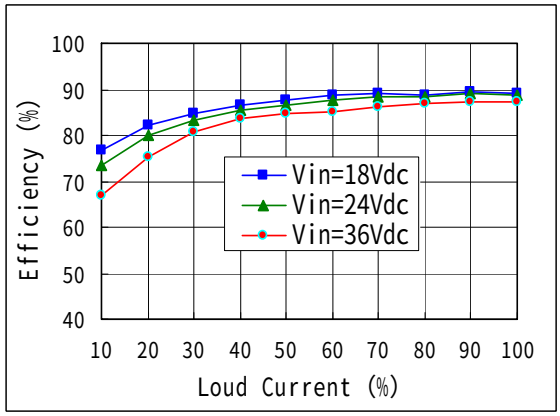

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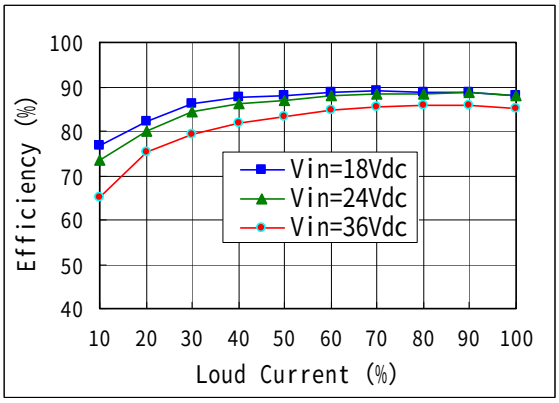

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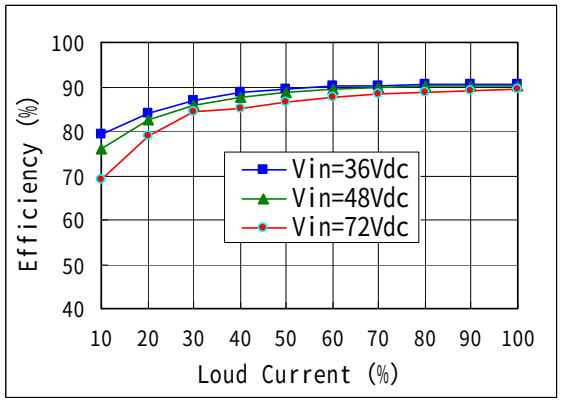

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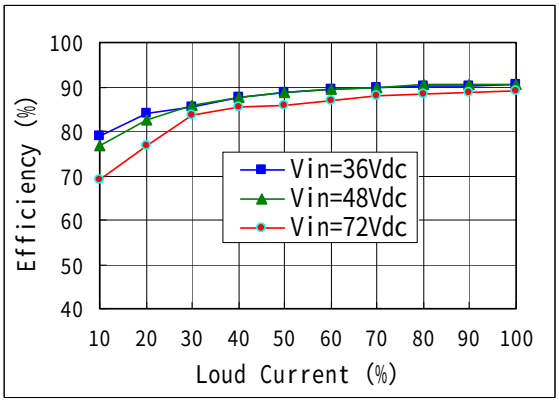

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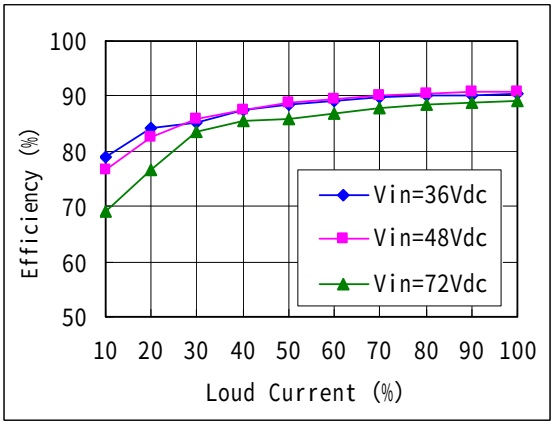

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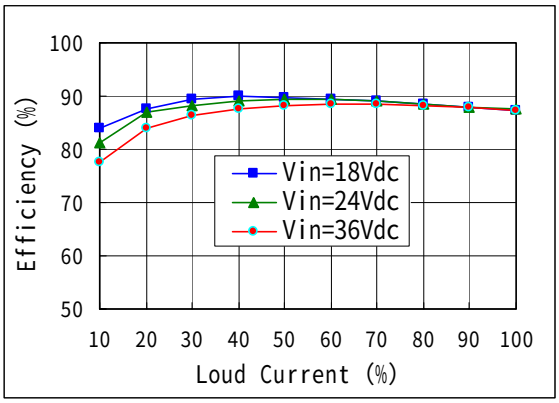

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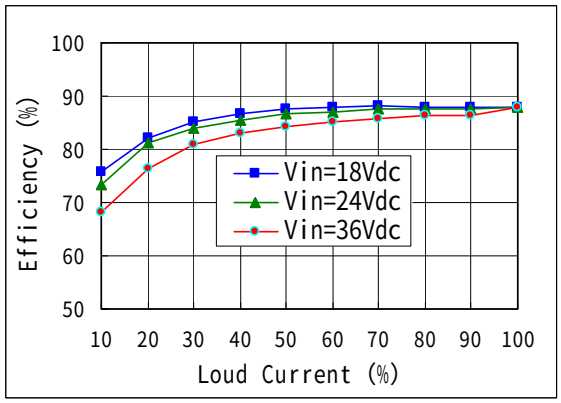

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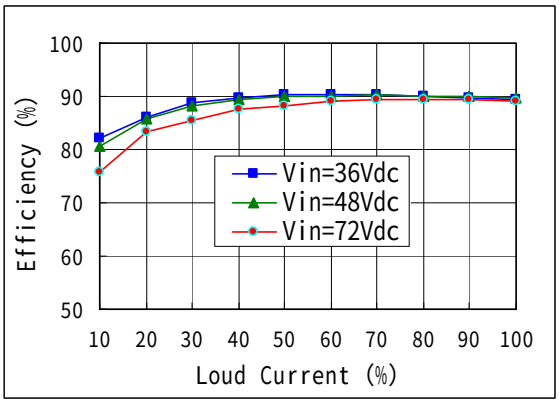

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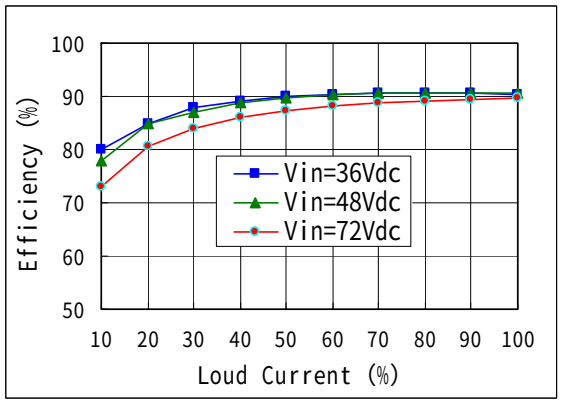
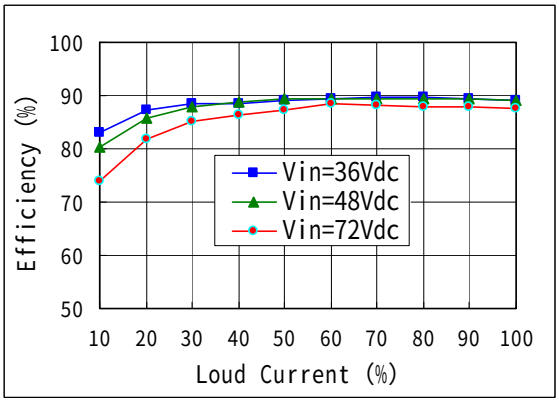


YHD100-48S24

Efficiency

Efficiency



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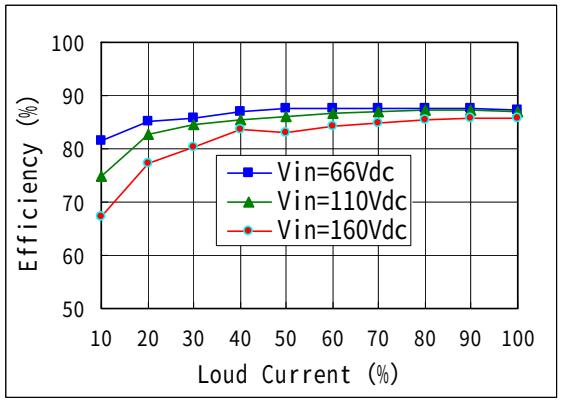

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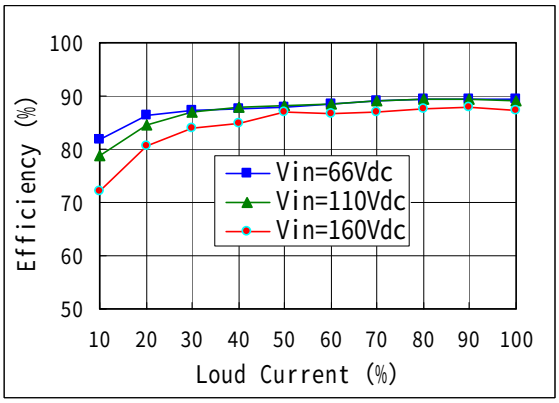

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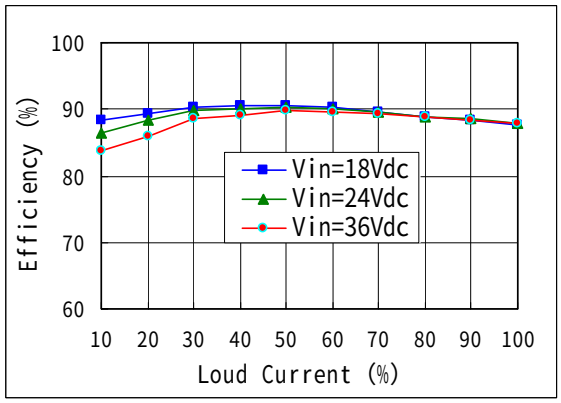

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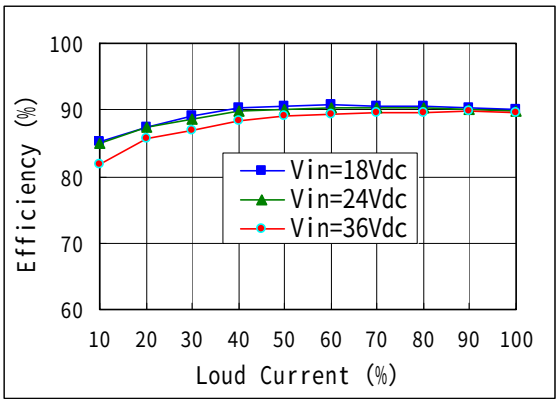

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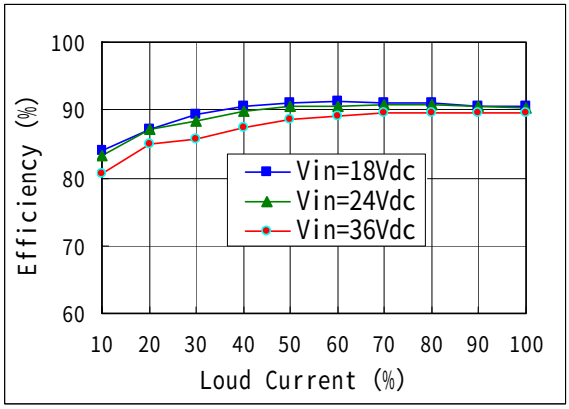

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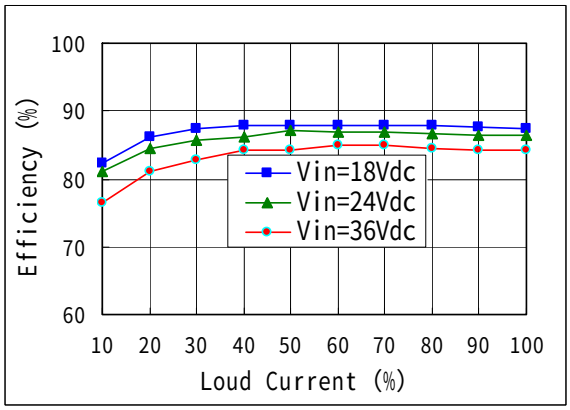

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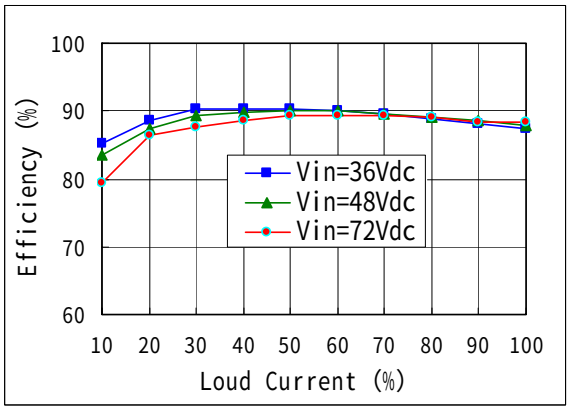
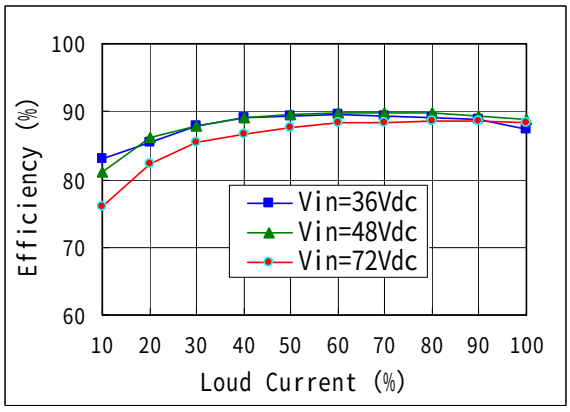


YHD150-48S12

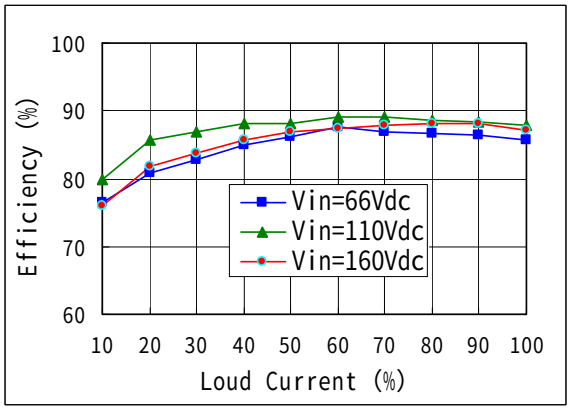
Efficiency

Efficiency



YHD150-48S24

TBD
YHD150-48S48



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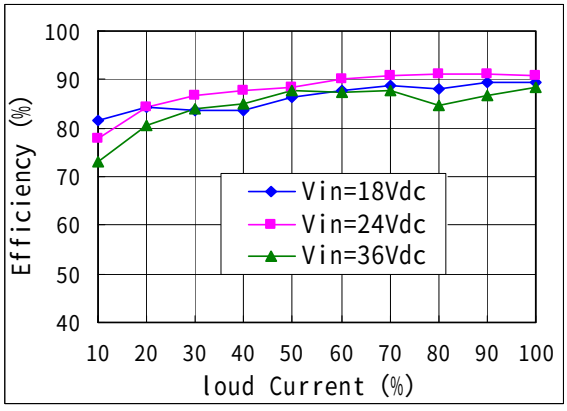

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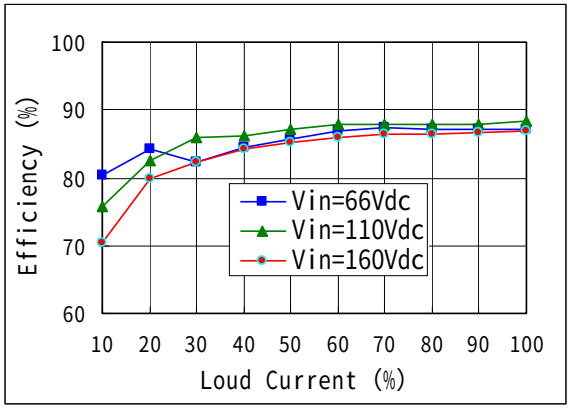

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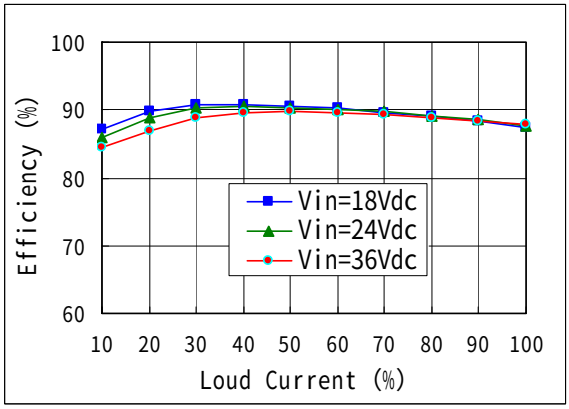

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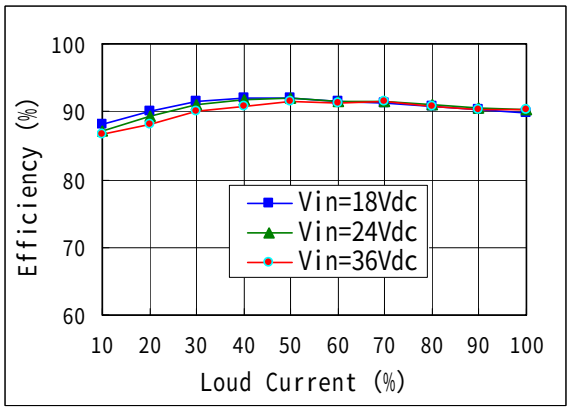

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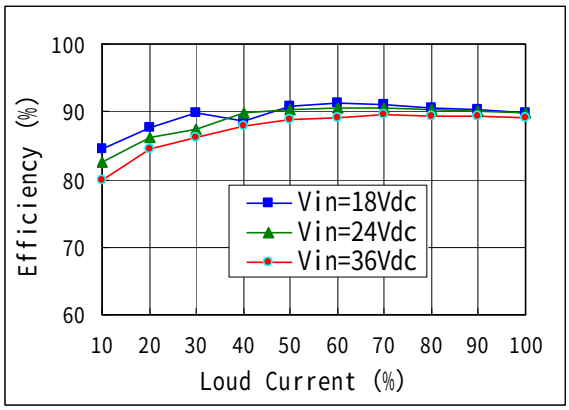
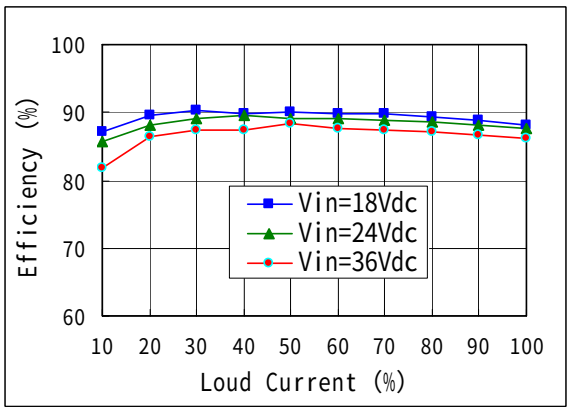


YHD200-24S24

Efficiency

Efficiency



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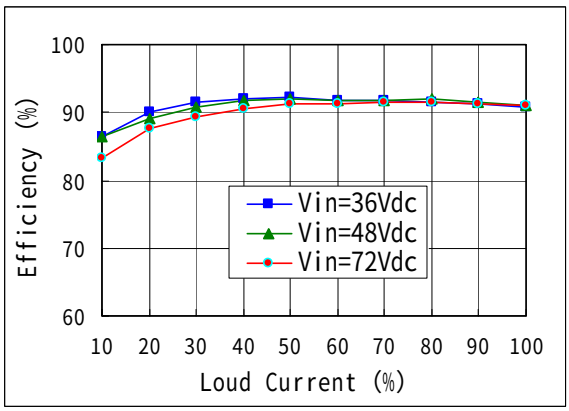
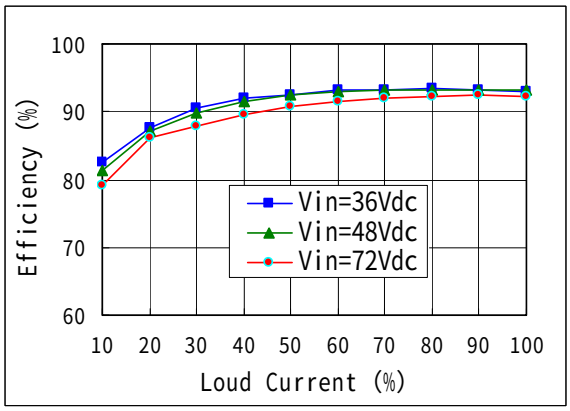


YHD200-48S12



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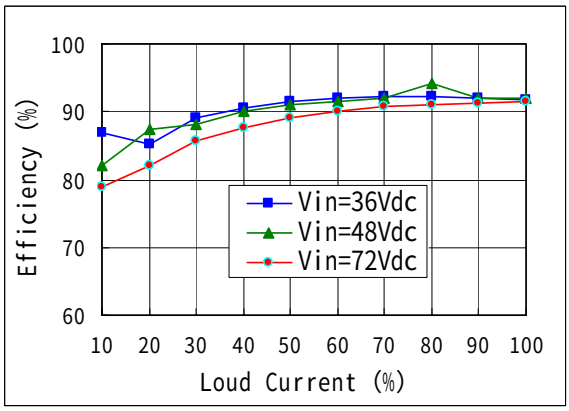

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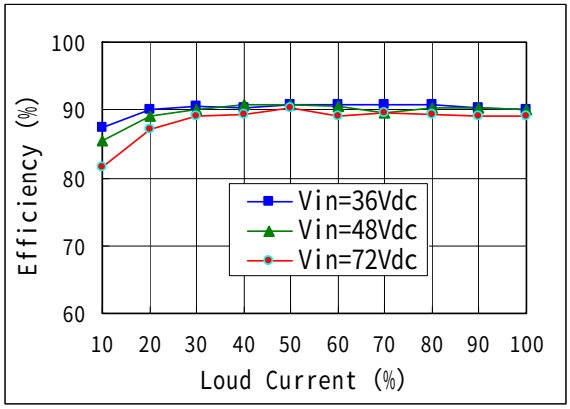
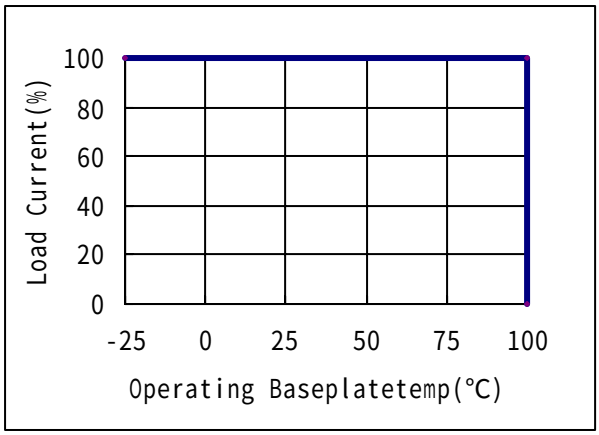


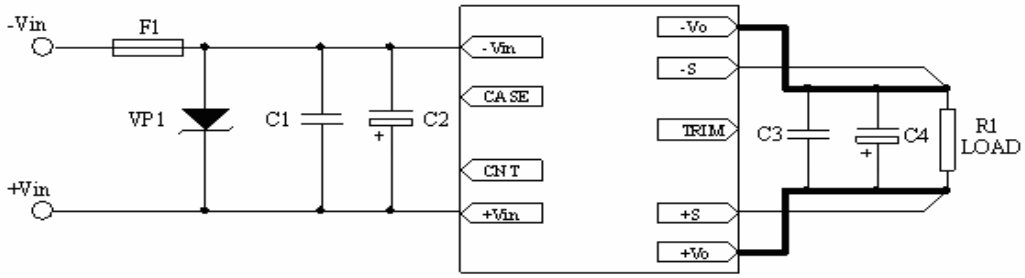
YHD200-48S48

Derating



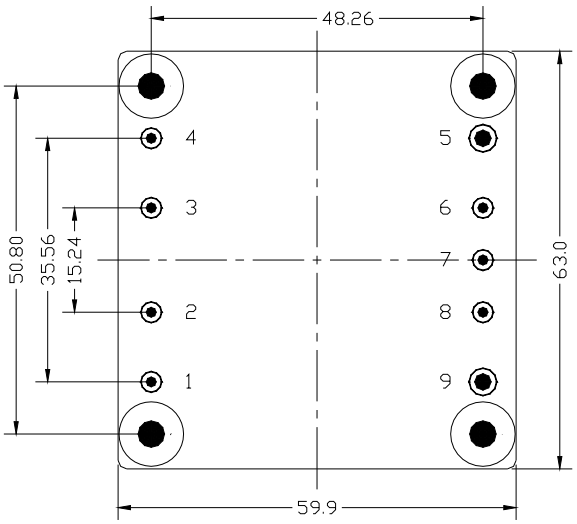
Design Considerations

Basic Connection



Notes: The basic connection indicates the basic requirements. Please refer to the instruction followed for further information.

Recommended Layout

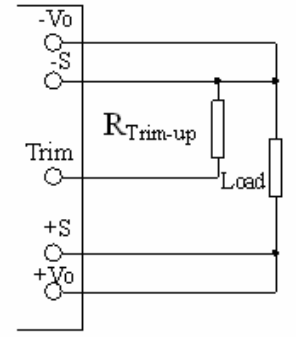


NO.	Recommendation & Notes
Pad Design	1-4、6-8 Pad holes: 1.5mm，pad diameter including hole:2.5mm; 5、9 Pad holes: 2.5mm,pad diameter including hole:4.50mm; the fixed holes at the four corners are metallized, with diameter of 3.3mm and pad diameter including hole: 5.3mm-6.3mm.
Airflow Direction	The air should flow along the direction of the heat sink
Safety	Isolated Converters, care to the spacing between input and output, input and protective ground、output and protective ground.
Electrical	The Vin(-) and Vo(-) planes should be placed under of the converter separately. Avoid routing sensitive signal or high disturbance AC signal under the converter.

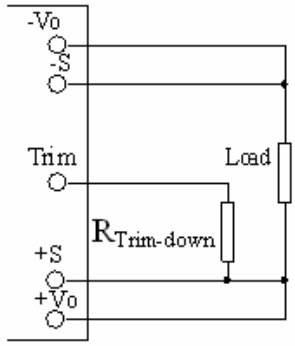
Output Voltage Adjust

The converters have an Output Voltage adjust pin (Trim). This pin can be used to adjust the output voltage above or below Output voltage initial setting. When increasing the output voltage, the voltage at the output pins (including any remote sense offset) must be kept below the maximum output adjust range, or the characteristics will not be assured in compliant with the specification, even the over voltage protection may be triggered. Also note that at increased output voltages the maximum power rating of the converter power, remains the same, and the output current capability will decrease correspondingly, at decrease output voltages the maximum current should not exceed the max output current. When the trim pins are not used, they should be floated.

External circuit is connected as the figure shown.



Connection for Trimming Up



Connection of Trimming Down

Remote Control

Remote control can be offered by setting right control voltage level (refer to -Vin pin)to CNT pin.

Positive Logic Control: When the level is higher than 3.5V or be left floating, the converter will be on. When the level is less than 1.5V, the converter will be off. when low level applied, the CNT source current is less than 1mA. Care should be taken to prevent CNT from surge, A TVS should be used in some cases.

Remote Sense

The remote sense can be used to compensate for the voltage drop between the output pins of the converter and the load input pins by +S、-S pins. The +S and –S pins should be connected to the input pins of the load respectively. The remote sense circuit will compensate for up to 0.5V drop between the sense voltage and the voltage at the output pins. If the remote sense is not needed, the –S should be connected to -Vo and +S should be connected to +Vo.

The anti-interference design should be considered when the +S、-S pins are connected to the pins to be compensated. The +S、-S traces should be located close to a ground trace or ground plane, and the area they surrounded should be minimized (just for electrical isolation); If cable connection presents, twisted pair wires should be used, EMI core are equipped with the twisted pair wires to reduce common mode noise when necessary, the sense leads should not be longer than 200mm,or the system characteristics may not be assured.

The sense leads only can carry very little current, and are not used for converter power output. Care should be taken in operation to avoid damaging the converter.

Over Temperature Protection(OTP)

The regulators are protected from thermal overload by an internal over temperature shutdown circuit. When the baseplate temperature exceeds the temperature trig point, the OTP circuit will cut down output power. The regulator will stop until safe operating temperature is restared. Hysteresis temperature between OTP trig point and restart is approx 10°C. Time between OTP and restart is dependent on cooling of the regulator.

Output Over Voltage Protection(OVP)

The switching-off type over voltage protection feature is used to protect the converter, when output voltage exceeds 115% to140% of the rated output voltage (the set point is between 115%-140%, there is the difference based on the specific parameters, but not beyond the range), the output voltage will shut down. When the converter internal detection circuit detect abnormal signals disappear the output will recovery.

External Capacitance

Unless special purpose (i.e. prolonging hold-up time, input impedance matching), the recommended input filter's capacitance ranges220μF～330μF, which not only offers a stable system, and reduces the cost, but also lessens the inrush current when the power supplies.

When larger capacitance is required, a circuit of suppressing the inrush current is recommended when the regulator start-up and a discharge circuit is recommended when the output dropped, ensuring the reliability and safety of other equipments in the system.

Series and Parallel Operation

The converters should not be paralleled directly to increase power, but they can be paralleled each other through o-ring switches or diodes. Make sure that every converter's maximum load current should not exceed the rated current at anytime, if they are paralleled without using external current sharing circuits.

The converters can operate in series. To prevent against start-up failure due to start up time difference, SBD with low voltage difference can be paralleled at the output pins(SBD negative terminal connect to the positive pin of the output) for each converter.

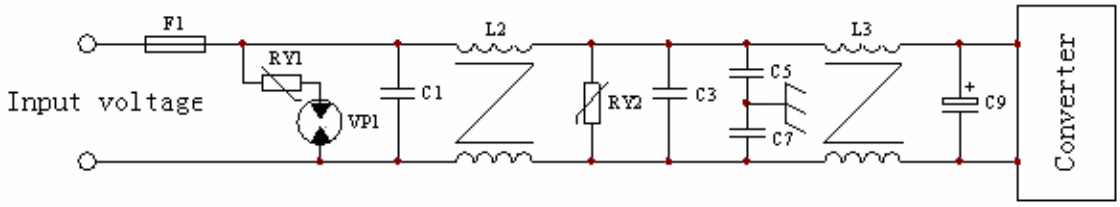
Product Installation

The product can be installed in user board, suggest using M3 screw to fix the products in user board, in order to enhance the bearing ability when impactive and vibration coming. Note that, when you hammer the product using screws, this product shall be first fixed, again a needle pin welding, prevent strain soldered dot. Moreover the biggest torque of fastening screw cannot exceed 0.6 N.m,otherwise it will likely damage. the structural related to studs.

Metal surface of this product structured by aluminum PCB which has good thermal conductivity , mapping the overburden with heat conduction conlents or thermal gaskets, then install proper radiator.

Proper radiator and flows through radiator wind will greatly enhance products cooling capacity. when you install radiator ,you should be paid attention to the length of the bolt, ensure that has no relevant relatives with the screws fixed on PCB.

EMC Consideration



Conductive Interference will be emphasized in the following consideration, surge、 EFT、 conducted interference generated from the converter to power supply system, and so on. Some tests, like static, radiation, should be considered in the whole system design.

RY1、RY2、VP1 in the figure are VDR and discharge tube respectively, for the suppression of the differential mode interference conducted along with the wire. The maximum surge current of the VDR and Impulse Discharge Current of the discharge tube, Imax should not less than 3KA,Varistor voltage or DC Spark over Voltage must be 1.5 times of the converter input voltage. For lower level protection, RV2 can be remained only. It is advised to remain L2， if not, the differential mode inductor should be set, or others to make sure inductive resistance exists in the circuit, for a longer life to RY2.

The function of L2、L3、C5、C7、C3、C1 is for filtering differential mode and common mode interference.

L2&L3 are for low frequency and high frequency separately. If only one common mode choke is required to remain for some reasons, the impedance characteristic of input voltage source should be considered comprehensively, L3 may be removed for low impedance and L2 may be removed for high impedance, the inductor for filtering within 10MHz should be focused on.

Safety Consideratio

The module, as one component for the end user, should be installed into the equipment. It is required to meet safety requirements in the system design.
To avoid fire and be protected when short circuit occurred, it is recommended that a fast blow fuse with rating 2 -3 times of converter continuous input peak current is used in series at the input terminal.(Inrush current suppression circuit is required for greater filter capacitance at input terminal, or it will result in the misoperation of the fuse).

Cleaning Notice

The converter is suitable for water washing, because it does not have any pockets where water could be trapped long-term. Users should ensure that the drying process is adequate and of sufficient duration to remove all water from the converter after washing, do not power up the unit until it is completely dry.

Delivery Package Information

Package material is multiple wall corrugated, internal material is anti-static foam，it's surface resistance is from $10^5\Omega$ to $10^{12}\Omega$。Tray capacity: 12 PCS/box，Tray weight: 0.9~1.0kg；Carton capacity:15×12=180 PCS，Carton weight:13~14kg.

Quality Statement

The converters are manufactured in accordance with ISO-9001 system requirements, in compliant with YD/T1376-2005, and are monitored 100% by auto-testing system, 100% burn in.
The warranty for the converters is 5-year.

Contact Information

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