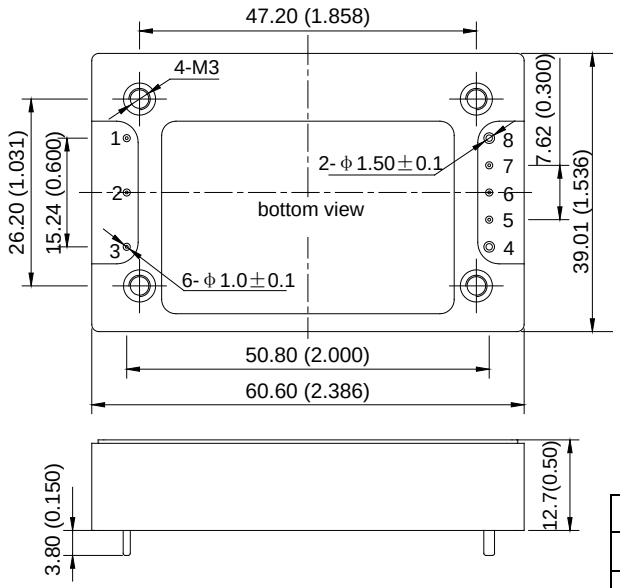
NTP2415QN26W Non-Isolated DC-DC Converters

Input 9V～36V, Output 26V/11.5A, Industry Standard Quarter Brick

Contents

Outline Diagram



Notes：all dimensions in mm(inches)
Tolerances：X.X±0.5 (X.XX±0.02)
X.XX±0.25 (X.XXX±0.010)
Case material: Black flame retardant Plastic;
Pins: Copper alloy with gold plating;
Aluminum baseplate can be connected to Protective Earth by M3 screw.

RoHS

Features

- ***Quarter Brick：60.6mm×39.01mm×12.7mm***
- ***Wide Input Voltage（9.0Vdc～36.0Vdc）***
- ***Input Under Voltage Threshold（8.1Vdc～8.9Vdc）***
- ***Input Under Voltage Resume Point（9.0Vdc～10.0Vdc）***
- ***Negative Logic Control（0V to 1V turn on or CNT floating）***
- ***Output Voltage Adjust Range: ±10% of the rated output voltage***
- ***High Efficiency up to 96% typ.***
- ***Output Short-circuit Protection,automatic recovery***
- ***Over Temperature Protection(OTP)***
- ***Operating Ambient Temperature -40℃ to +70℃***
- ***Maximum Load Current:11.5A***
- ***Applications: Telecom & Datacom ,Industry, and Rail transit &Railway application***

Pin	Symbol	Function
1	-Vin	Negative Input
2	CNT	Remote Control, turn on/off the converter without cutting off the power supply
3	+Vin	Positive Input
4	+Vo	Positive Output
5	+S	Positive Remote Sense, connected to +Vo pin when not in use
6	TRIM	Output Voltage Trim, voltage be trimmed up or down by applying external resistor connected to +S or -S output
7	-S	Negative Remote Sense, connected to -Vo pin when not used
8	-Vo	Negative Output

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Specification

Unless otherwise specified, all tests are at room temperature and standard atmosphere, pure resistive load and basic connection.

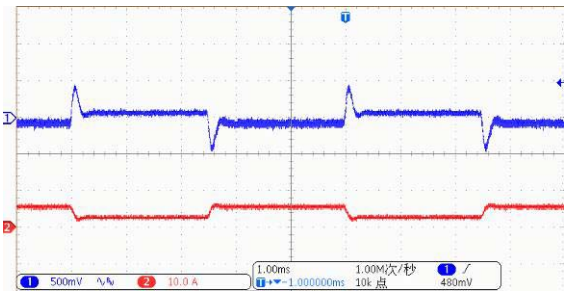
Input		Symbol	Min	Typ	Max	Unit	Conditions
Input Voltage		V_{in}	9	24	36	V	10V strat-up
Maximum Input Current		$I_{in,max}$	—	—	17.5	A	V_{in}=18V，I_o=11.5A
Under Voltage Threshold		V_{UVLO}	8.1	—	8.9	V	—
Under Voltage Resume Point		V_{UVR}	9.0	—	10.0	V	—
Input Over Voltage Reference Point		V_{ovlo}	44	—	50	V	—
Negative Logic Control	On	—	0	—	1	V	Refer to -V_{in}；Turn on when CNT floating
	Current	—	—	—	1	mA	CNT source current when turn on
	Off	—	2.0	—	10.0	V	Refer to -V_{in}
	Current	—	—	—	1	mA	CNT sink current when turn off

Output		Symbol	Min	Typ	Max	Unit	Conditions
Output Voltage		V_o	25.48	26.00	26.52	V	—
Output Current		$I_{o,nom}$	0	—	11.5	A	Meet Characteristic Curve “Input Voltage Vs Output Load Current”
Line Regulation		S_V	—	—	±1	% V_o	V_{in}：9V～36V
Load Regulation		S_I	—	—	±2	% V_o	$V_{in,nom}$，I_o=0～11.5A
Output Voltage Adjust Range		V_{trim}	23.4	—	28.6	V	Trim up：P_o≤300W Trim down：I_o≤11.5A
Output Overshoot		–	0	—	±10	%V_o	$V_{in,nom}$，pure resistive load
Remote Sense Compensation Range		V_{sense}	—	—	0.5	V	+S and -S twisted Pair，length is less than 20cm
Output Over Current Protection Range		$I_{o,lim}$	12.65	—	17.25	A	$V_{in,nom}$
Peak to Peak Ripple and Noise		$\triangle V_{pp}$	—	—	150	mV	20MHz bandwidth, Output equipped 10μF tantalum capacitor and 1μF ceramic capacitor
Output Short-circuit Protection		Hiccup mode,automatic recovery					
Rise Time		T_{rise}	—	30	—	ms	$I_{o,nom}$，pure resistive load
Start-up Delay Time		T_{delay}	—	5	—	ms	$I_{o,nom}$，pure resistive load
Capacitive Load		C_o	0	—	2200	μF	pure resistive load
Load Transient	Recovery Time	t_{tr}	—	—	400	μs	25%～50%～25%$I_{o,nom}$ or 50%～75%～50% $I_{o,nom}$，0.1A/μs；50%～100%～50$I_{o,nom}$，2.5A/μs
	Voltage Deviation	$\triangle V_{tr}$	—	—	±4	%V_o	

General	Symbol	Min	Typ	Max	Unit	Conditions
Efficiency	η	—	96	—	%	V_{in}=24V，I_o=11.5A
Switching Frequency	f_s	—	350	—	kHz	—
MTBF	—	—	2×10^6	—	h	BELLCORE TR-332
Operating Ambient Temperature	—	-40	—	70	℃	—
Operating Baseplate Temperature	—	-40	—	100	℃	—
Storage Temperature	—	-55	—	+125	℃	—
Thermal resistance	$R_{\theta CA}$	—	10	—	℃/W	—
Relative Humidity	—	10	—	95	%	No Condensing
Temperature Coefficient	S_T	—	—	±0.02	%/℃	—
Over Temperature Protection Reference Point	T_{ref}	100	110	125	℃	Baseplate Temperature
Hand Soldering	Maximum soldering Temperature < 425℃， and duration < 5s					
Wave Soldering	Maximum soldering Temperature < 255℃， and duration < 10s					
Vibration and Shock	Meets EN50155					
Weight	—	—	70	—	g	—

Characteristic Curves

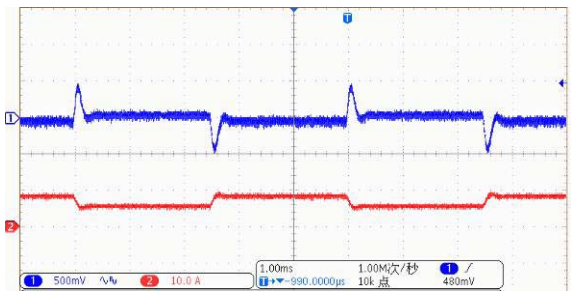
Load Transient Response



Load change:25%～50%～25% $I_{O,nom}$, 2.5A/μs
Vin=24Vdc

Trace1: 0.5V/div
Trace2: 10A/div
Time scale: 1ms/div

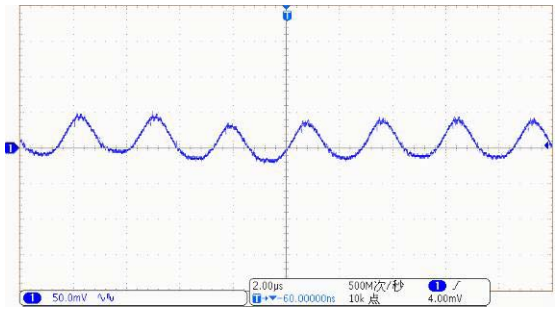
Load Transient Response



Load change:50%～75%～50% $I_{O,nom}$, 2.5A/μs
Vin=24Vdc

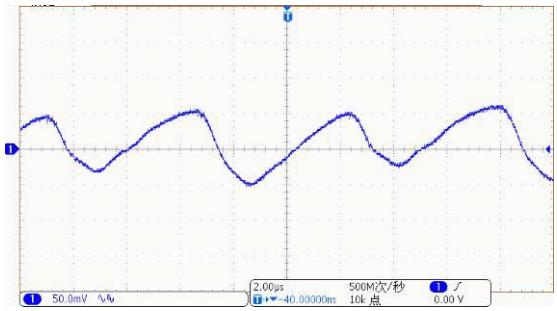
Trace1: 0.5V/div
Trace2: 10A/div
Time scale: 1ms/div

Output Ripple and noise



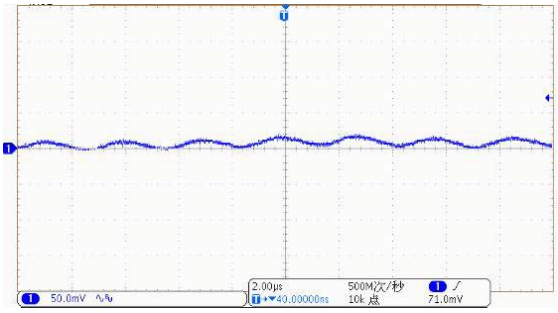
V_{in}=18Vdc,I_o=11.5A

Output Ripple and noise



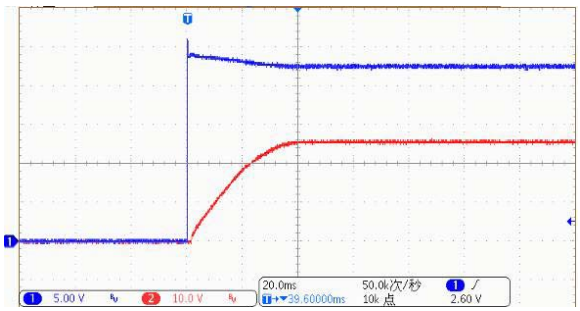
V_{in}=24Vdc,I_o=11.5A

Output Ripple and noise



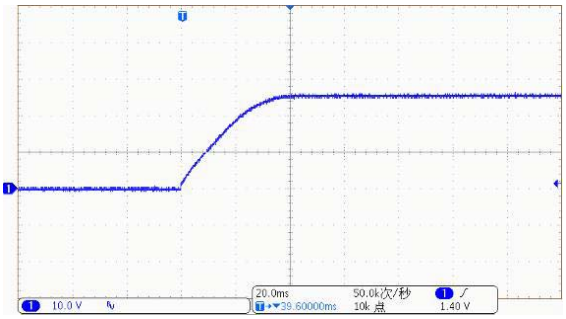
V_{in}=36Vdc,I_o=11.5A

Start-up Delay Time



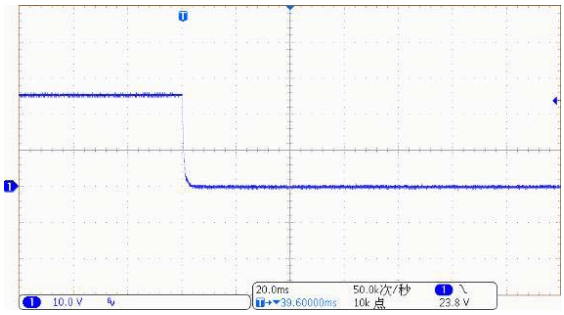
V_{in}=24Vdc,I_o=11.5A

Rise Time



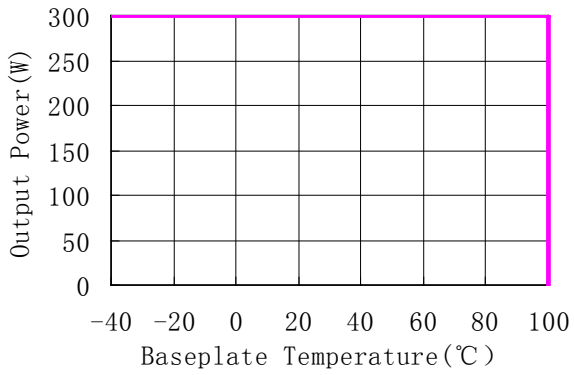
V_{in}=24Vdc,I_o=11.5A

Turn-off

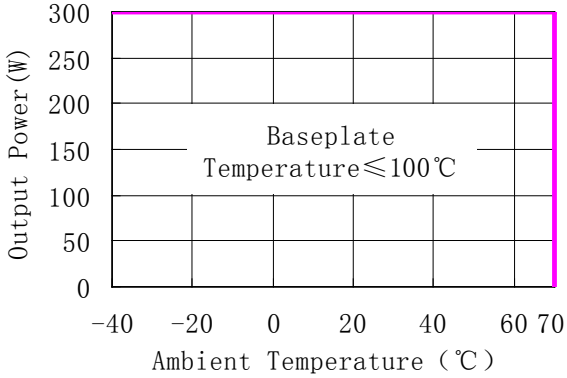


V_{in}=24Vdc,I_o=11.5A

Derating Curve 1



Derating Curve 2



Note:during the converters'installation,attention should be paid to the flow direction of the hot air to ensure the smooth exchange of the heat with the environment. As long as the baseplate temperature does not exceed 100℃, the converters can work normally within the required ambient temperature range. For the specified ambient temperature, users can increase airflow and change the size of heatsink to improve the heat dissipating for the module with baseplate.

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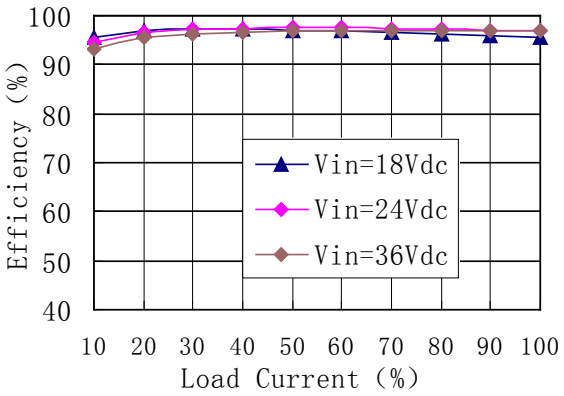
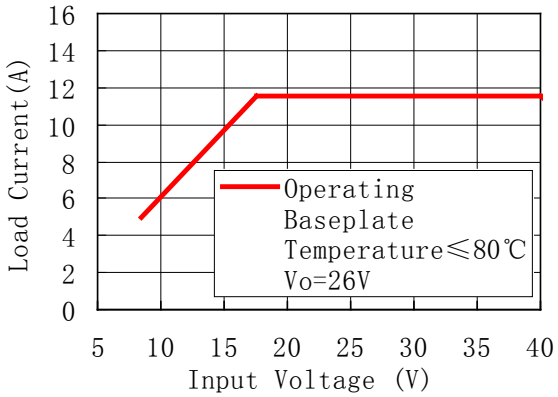
Efficiency vs Load Current

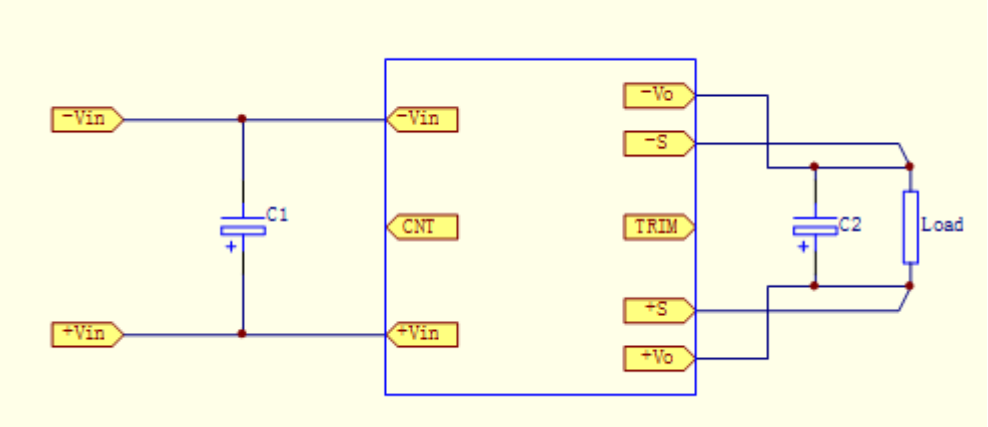


Input Voltage Vs Output Load Current



Design Considerations

Basic Connection

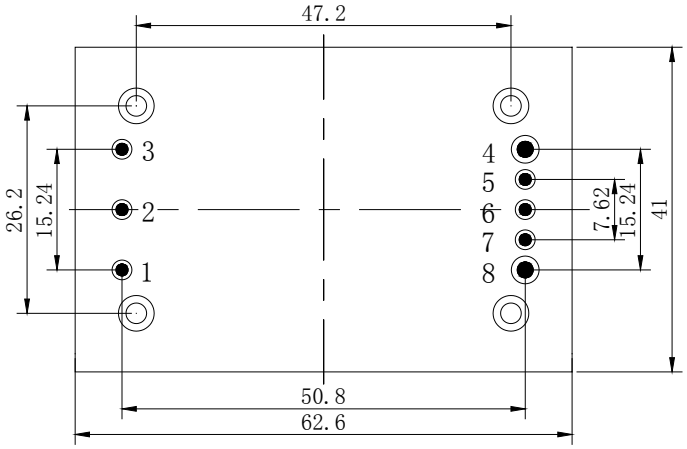


Notes: The basic connection indicates the basic requirements that the power module can provide rated output voltage and rated power only, Please refer the instruction followed for further information.

Parameter description:

No.	Model	No.	Model
C1	100μF/50V aluminum electrolytic capacitor	C2	220μF/50V aluminum electrolytic capacitor

Recommended Layout



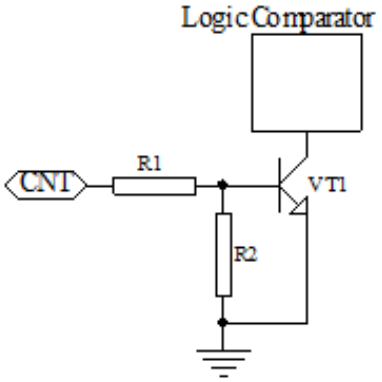
NO.	Recommendation & Notes
Pad Design	4 and 8 Pad holes is 1.9 mm，pad diameter including holes is 3.5mm in the X direction,2.3mm in the Y direction; the rest is 1.5mm, pad diameter including hole is 2.5 mm in the X direction,2.1mm in the Y direction.
Electrical	The Vin(-) and Vo(-) planes should be placed under of the converter separately. Avoid routing sensitive signal or high disturbance AC signal under the converter

Input Voltage Range

The input voltage range of the DC/DC converter is 9V～36V. The input impedance of the converter looks like a negative resistor, which can interact with the reactance of the power bus (including any filter elements that have been added to the input of the converter), causes an unstable condition.

Remote Control

Remote control can be offered by setting right control voltage level to CNT pin. NTP2415QN26W is provided with negative logic remote control. The circuit diagram is shown as "Internal Circuit Diagram". When the level is less than 1V or the pin is left floating, the converter will turn on, When the level is higher than 2V， the converter will turn off.

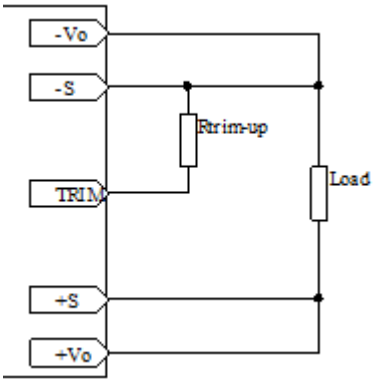


Internal Circuit Diagram

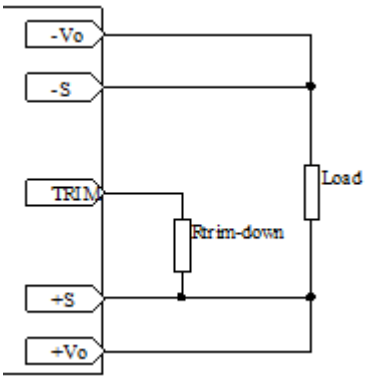
Output Voltage Adjust

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.The maximum value of the trimmed up is 10%, even +S and –S pins are used to compensate the voltage simultaneously, the sum of the trimmed up and the compensation should not be more than 10%, or the characteristics will not be assured in compliant with the specification, even the over voltage protection may be triggered. The output power can not exceed300W at increased output voltages, and the output current can not exceed 11.5A.

External circuit is connected as the figure shown, the resistance is calculated as the formula below, please note that the formula will be invalid when $R_{Trim-up}$、$R_{Trim-down}$ are used simultaneously, users adjust the value based on the resistance applied.



Connection of Trimming Up



Connection for Trimming Down

Resistance for trimming up ： $$R_{trim-up}=\left(\frac{28}{2(Vo+\Delta V)-50.72}\right)K\Omega$$

Resistance for trimming down： $$R_{trim-down}=\left(\frac{624.64-146.8(Vo-\Delta V)}{2(Vo-\Delta V)-52.32}\right)K\Omega$$

$R_{Trim-up}$、$R_{Trim-down}$:Resistance for trimming up or down, Unit:kΩ;

△V：Change rate, divide output voltage by rated output voltage;

For example：trimmed down voltage to 22V,then △V=26-22=4V;

$$R_{trim-down}=\left(\frac{624.64-146.8(Vo-\Delta V)}{2(Vo-\Delta V)-52.32}\right)=313K\Omega$$

External Capacitance

Unless special purpose (i.e. prolonging hold-up time, input impedance matching), the recommended input filter's capacitance ranges 100μF to 470μF, 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.

Over Temperature Protection

The over temperature protection feature is used to protect the converter, and the sensor locates in the baseplate. If the temperature of the baseplate exceeds the threshold of 110℃, the converter will shut down. The converter will stop until safe operating temperature is restored. Hysteresis temperature between OTP trig point and restart is approx 10°C. Time between OTP and restart is dependent on cooling of the regulator ,and radiation to the surrounding environment. If the surrounding environment does not change, restart will work cycle by cycle.

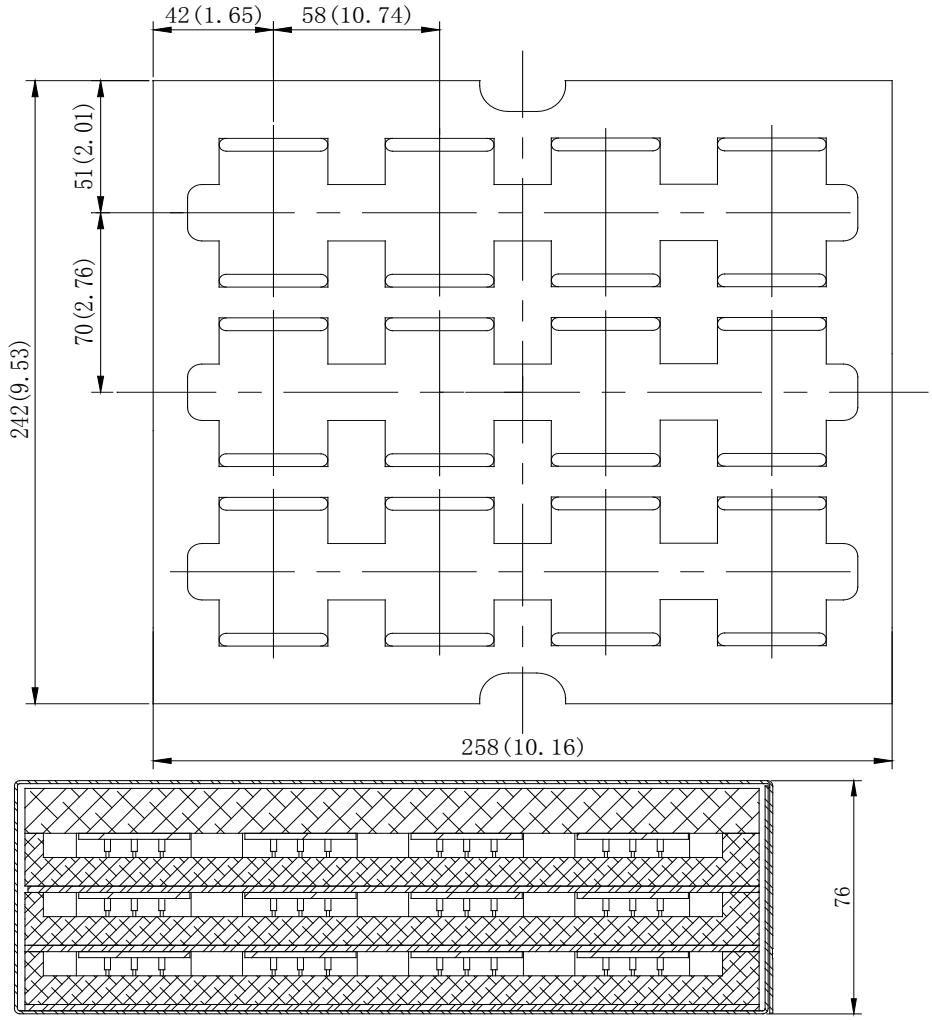
Remote Sense

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 maximum 0.5 voltage drop between the sense voltage and the voltage at the output pins.
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.

Thermal Consideration

The converters operate in a variety of thermal environments，however，sufficient cooling should be provided to ensure reliable operation of the unit. Heat is removed by conduction, convection and radiation to the surrounding environment. During the converters'installation,attention should be paid to the flow direction of the hot air to ensure the smooth exchange of the heat with the environment，As long as the baseplate temperature does not exceed the over temperature protection reference point,the converters can work normally.
For the specified ambient temperature, users can increase airflow and change the size of heatsink to improve the heat dissipating for the module with baseplate, the derating curves should be referred or external heat dissipation measures.

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: 3×12=36 PCS/box，Tray weight: 2.72kg，Carton capacity:4×36=144 PCS，Carton weight: 11.5kg

Quality Statement

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

Contact Information

Anhui Hesion Trading Co.,Ltd.
& Beijing Yihongtai Technology Dev.Co.,Ltd

TEL: +86-551-65369069,65369067
Email: alecz@ahhesion.com
Backup:alecz@126.com

www.ahhesionpower.com