DC-DC Isolation converter
MDH300-540S24 Series

FEATURES

- Wide input voltage range:3:1
- Efficiency up to 89%
- Low non-load power consumption
- Operating temperature range: -40℃ to +105℃
- High insulation voltage: Input -output 3000VDC, input -case 2100VDC
- Input under-voltage protection, output over-current, over-voltage, over-temperature, short circuit protection
- Standard 1/2 brick package

CE

MDH300-540S24 is a high-performance power supply designed for the railway industry. It has a rated input voltage of 540VDC, an output of 24/300W, no minimum load requirements, a wide voltage input of 300-900VDC, and a stable single output. High isolation insulation voltage, allowing working temperatures up to 105 ℃, with functions such as input undervoltage protection, output overcurrent protection, overvoltage protection, over temperature protection, short circuit protection, remote control and remote compensation, and output voltage regulation. Compliant with EN50155 railway standard, widely used in railway systems and their associated equipment.

Selection Guide

Part No.	Input Voltage (VDC)	output power (W)	Output Voltage (VDC)	output current (A)	Ripple&Noise (mV)	Full Load Efficiency (%) Min/Typ.	Remark
MDH300-540S24	300-900	300	24	12.5	240	87/89	Standard positive logic
MDH300-540S24N							Standard negative logic
MDH300-540S24H							Radiator positive logic
MDH300-540S24NH							Radiator negative logic

Input Specifications

Item	Operating conditions	Min.	Typ.	Max.	Unit
Maximum input current	300V input voltage, full load output	--	--	2	A
No load input current	Rated input voltage	--	--	20	mA
Input surge voltage (1sec. max)	Input voltage exceeding this range may cause permanent damage	-0.7	--	1000	VDC
Start up voltage		--	--	300	
Input under-voltage protection	No load test, full load test will provide over-current protection in advance	--	--	270	
Remote control foot (CNT)	Positive logic: CNT suspended or connected to 3.5-15V it starts up, connected to 0-1.2V it shuts down				Reference voltage-VIN
	Negative logic: CNT suspended or connected to 3.5-15V it shuts down, connected to 0-1.2V it starts up				

Output Specifications

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Item	Operating conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy	standard input voltage, ranging from 0% to 100% load	--	±0.5	±1.0	%
Linear regulation rate	Full load, input voltage changes from low voltage to high voltage	--	±0.2	±0.5	
Load regulation rate	Nominal input voltage, ranging from 10% to 100% load	--	±0.2	±0.5	
Transient Recovery Time	25% load step change (step rate 1A/50uS)	--	200	250	uS
Transient response deviation		-5	--	5	%
Temperature drift coefficient	Full load	-0.02	--	+0.02	%/℃
Ripple & Noise	20M bandwidth, external connection of over 220uF capacitor for testing	--	200	240	mVp-p
Adjustable output voltage（**TRIM**）		-10	--	+10	%
Remote compensation of output voltage（**Sense**）		--	--	105	%
Over Temperature Protection	Internal detection of resistance temperature in the product	105	115	125	℃
Output over-voltage protection		35	--	40	%
Output over-current protection		13	--	16	A
Short Circuit Protection		Hiccup style, sustainable, self recovering			

General Specifications

Item	Operating conditions		Min.	Typ.	Max.	Unit
Isolation voltage	Input-output	Electric Strength Test for 1 minute with a leakage current of 3 mA max.	--	--	3000	VDC
	input-case		--	--	2100	VDC
	Output-case		--	--	500	VDC
insulation resistance	Input-output	insulation voltage 500VDC	100	--	--	MΩ
switching frequency			--	230	--	KHz
Mean time between failures			150	--	--	K hours

Environmental Characteristics

Item	Operating conditions	Min.	Typ.	Max.	Unit
Operating temperature	See temperature derating curve	-40	--	+105	℃
storage temperature	No condensation	5	--	95	%RH
Storage humidity		-40	--	+125	℃
Pin resistant to welding temperature	The distance between the welding point and the case is 1.5mm, and the welding time is less than 1.5S	--	--	+350	
Cooling Requirements		EN60068-2-1			
Dry heat requirement		EN60068-2-2			
Humidity and heat requirement		EN60068-2-30			
shock and vibration		IEC/EN 61373			

EMC（EN50155）

EMI	CE	EN50121-3-2	150kHz-500kHz 79dBuV
		EN55016-2-1	500kHz-30MHz 73dBuV
	RE	EN50121-3-2	30MHz-230MHz 40dBuV/m at 10m

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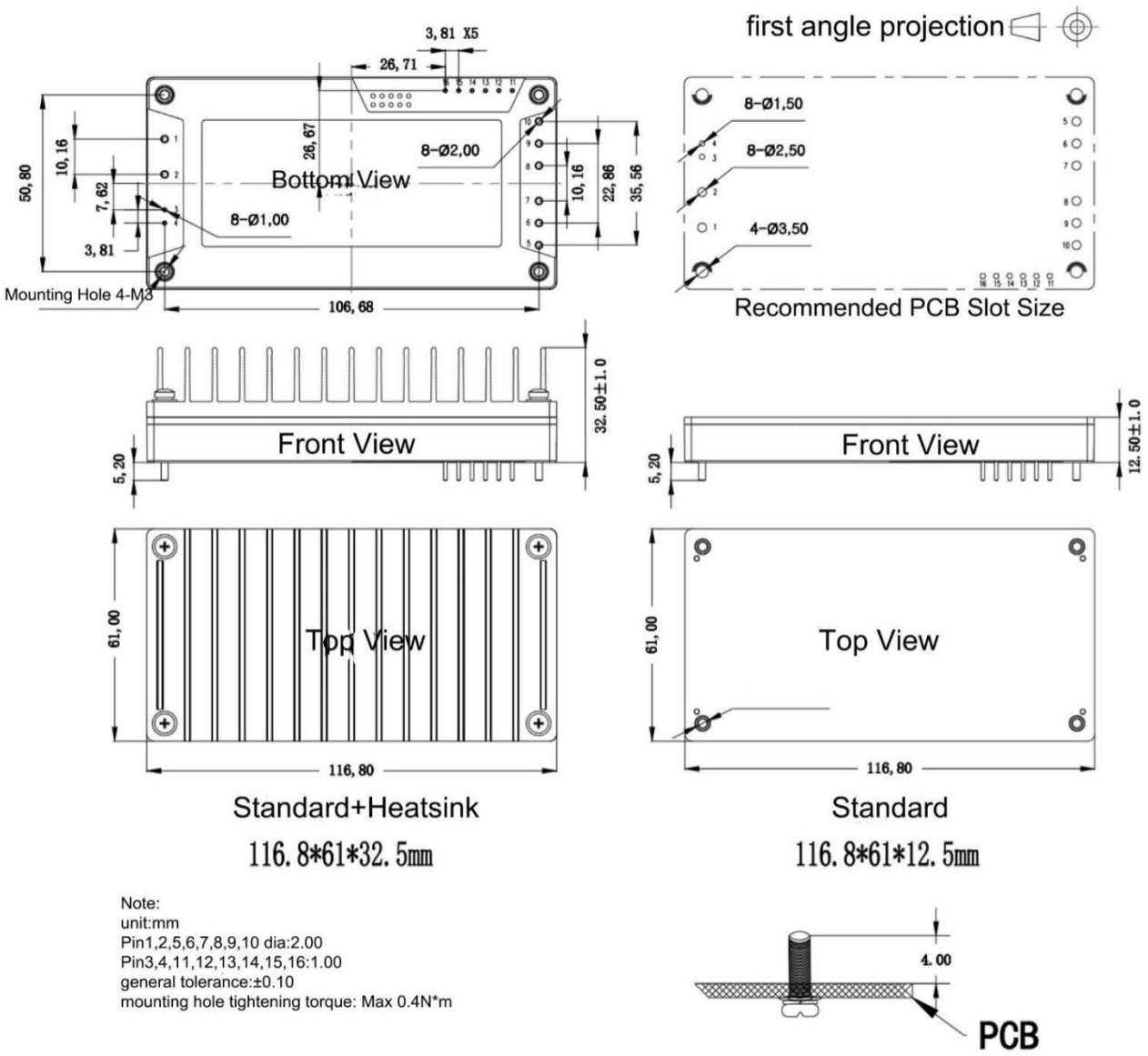
		EN55016-2-1	230MHz-1GHz 47dBuV/m at 10m	
EMS	ESD	EN50121-3-2	Contact ±6KV/Air ±8KV	perf. Criteria A
	RS	EN50121-3-2	10V/m	perf. Criteria A
	EFT	EN50121-3-2	±2kV 5/50ns 5kHz	perf. Criteria A
	Surge	EN50121-3-2	line to line ± 1KV （42Ω, 0.5μF）	perf. Criteria A
	CS	EN50121-3-2	0.15MHz-80MHz 10 Vr.m.s	perf. Criteria A

Physical Specifications

Case Material	Metal bottom shell+black flame-retardant material case **（UL94-V0）**
Radiator	Size **61*57.9*15mm**， weight **65g**， aluminum alloy material, anodized black
Cooling Method	Conducted heat dissipation or forced air cooling
Weight	Standard type 120g, radiator type 188g

Dimensions and Pin-Out



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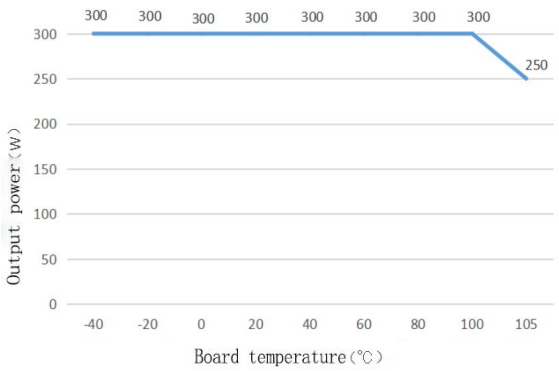
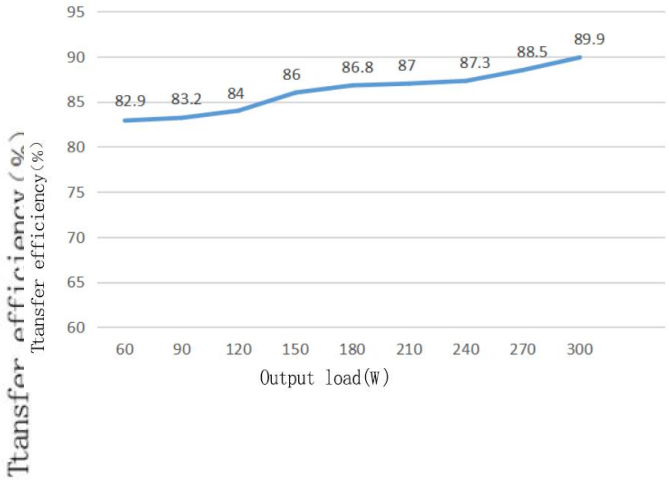
No.	1	2	3	4	5	6	7	8
Definition	**Vin+**	**CNT**	**Vin-**	**OUT-**	**-S**	**TRIM**	**+S**	**OUT+**
function	Input positive	Remote pole	Input negative	Output negative	Remote compensation negative pole	Output trim	Remote compensation positive pole	Output positive

Typical Characteristic Curves





Note:

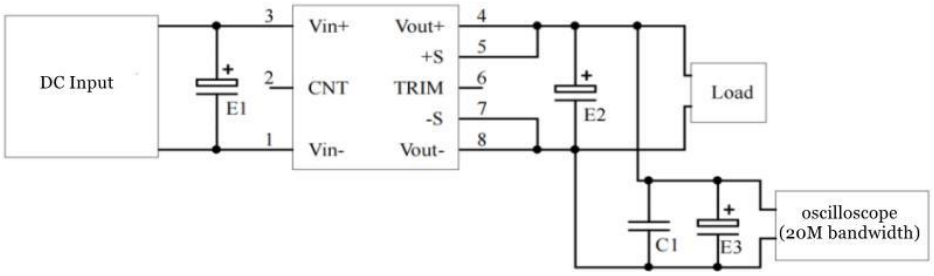
1. The temperature derating curve and efficiency curve are both typical value tests;

2. The temperature derating curve is tested according to our laboratory testing conditions. If the actual environmental conditions used by the customer are inconsistent, it is necessary to ensure that the temperature of the aluminum shell of the product does not exceed 105 ℃ and can be used within any rated load range.

Design Reference

1. Ripple&Noice

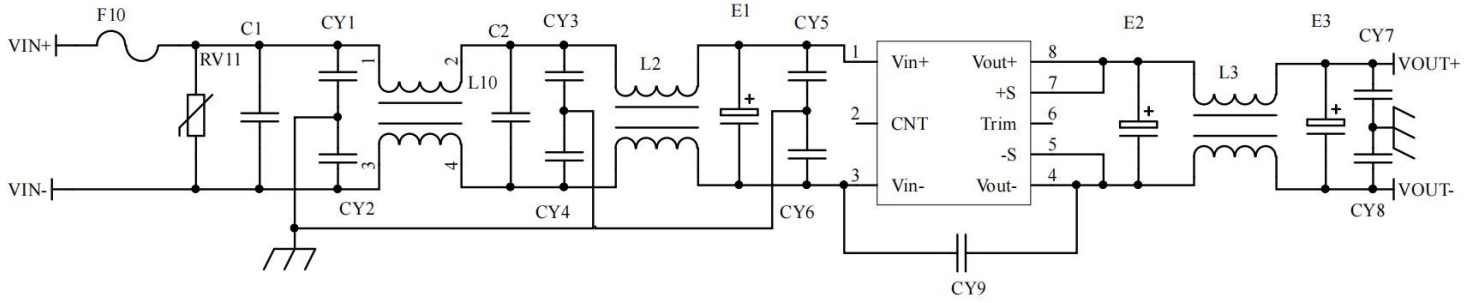
All DC/DC converters in this series are tested according to the recommended test circuit shown in the following figure before leaving the factory.



capacitor value / Output voltage	E1 (μF)	E2 (μF)	C1(μF)	E3 (μF)
3.3VDC	100	1000	1	10
5VDC		680		
12VDC		220		
.....				
48VDC				
.....	68	68		
110VDC				

2. Recommended application circuit

If the customer does not use our recommended circuit, please make sure to parallel an electrolytic capacitor of at least 100 μ F at the input end to suppress the surge voltage that may be generated at the input end.



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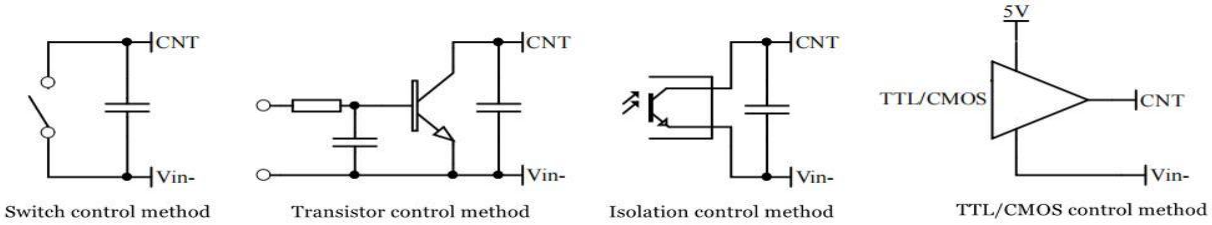
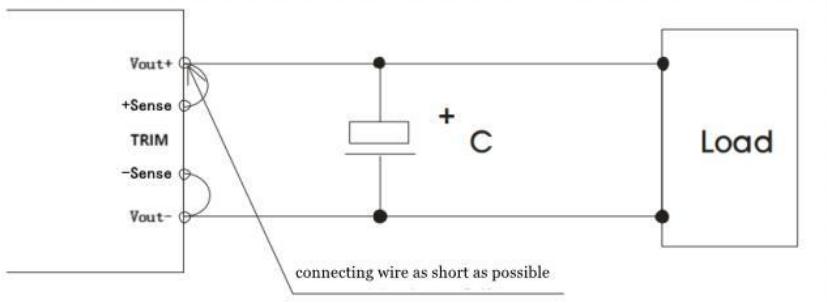
F1	T3.15A/1000V fuse
RV1	14D 1000V varistor
C1,C2	105/1200V Polyester film capacitor
CY1,CY2,CY3,CY4,CY5,CY6	102/250Vac safety standard Y2 capacitor
CY7,CY8	103/2KV ceramic capacitor
CY9	471/250Vac safety standard Y2 capacitor
E1	100μF/500V Electrolytic capacitor
E2, E3	220μf/35V low ESR capacitor
L1,L2	Inductance greater than 10mH, over current 2A, temperature rise less than 25 ℃
L3	Inductance greater than 0.5mH, over current 12.5A, temperature rise less than 25 ℃

3. Recommended application of remote control terminal (CNT) control mode



4. Usage and precautions of Sense

（1） **without using far-end compensation:**

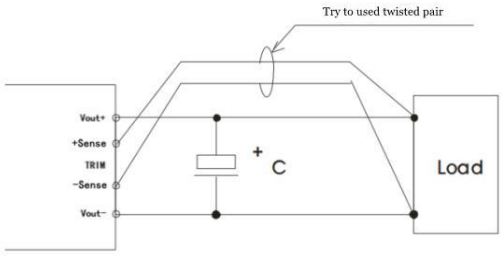


attention:

1. when without using far-end compensation, ensure that Vout+is short circuited to Sense+and Vout - is short circuited to Sense -;

2. The connection between Vout+and Sense+, Vout - and Sense - should be as short as possible and close to the pins, otherwise it may cause instability of the module.

(2) **using far-end compensation:**



attention:

When using a far-end compensation lead, it may cause unstable output voltage;

If using far-end compensation, please use twisted pair or shielded wire and make the lead as short as possible;

3. Please use wide PCB leads or thick wires between the power module and the load, and keep the line voltage drop below 0.3V to ensure that the power output voltage remains within the specified range;

4. The impedance of the lead may cause output voltage oscillation or significant ripple. Please verify before use.

5. The use of TRIM and the calculation of TRIM resistance

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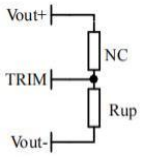
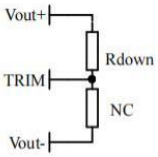
The relationship between the output change voltage △ U and resistance is as follows:



Voltage up regulation: add resistor Rup between Trim and output negative

Rup=70/△U-5.1 (KΩ)



Voltage Down: Add resistor Rdown between Trim and output positive

Rdown=28* (24-2.5-△U) /△U -5.1 (KΩ)

6. **This product does not support direct parallel connection to increase power. If parallel connection is required, please consult our technical personnel**

Others

1. This product has a two-year warranty period. If it is naturally damaged during the warranty period, it will be repaired free of charge. If the malfunction is caused by incorrect usage or manufacturing techniques, repairs will be charged.
2. Our company can provide customized products and matching filter modules. For specific details, please contact our technical personnel directly.

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