

RW-8W Series



8W Ultra Wide Input Range Regulated Single & Dual output

Features

- Ultra Wide Input Range
- Efficiency up to 86%
- 3000 VDC Isolation
- Continuous Short Circuit Protection
- Under voltage lock-out circuit
- Over Voltage Protection
- Over Load Protection
- -40°C~ 85°C Operation Temperature Range
- Remote On/Off
- EN 50155 approval for railway applications



The RW-8W series are high performance 8W single & dual output DC-DC converters. These converters are consisted with nickle-coated copper 24-pin DIL package with high performance features such as synchronous rectification, high efficiency and tight line / load regulation. Devices are encapsulated using flame retardant resin. Compliance with railway Input voltages of 24, 36, 48, 72, 96 and 110Vdc with output voltage of 3.3, 5, 12, 15, ± 5 , ± 12 , ± 15 . High performance features include high efficiency operation up to 86% and output voltage accuracy of $\pm 1\%$ maximum.

All specifications typical at Ta=25°C, nominal input voltage and full load unless otherwise specified

OUTPUT SPECIFICATIONS															
Output Voltage Accuracy	$\pm 1\%$														
Maximum Output Current	See table														
Line Regulation	$\pm 0.5\%$, max.														
Load Regulation (Io=0% to 100%)	$\pm 0.5\%$, max.														
Cross Regulation (Dual Output) (1)	$\pm 5\%$														
Ripple&Noise (20MHz Bandwidth)(2)	75mVpk-pk, max.														
Over Load Protection	160% of Iout ,typ.														
Over Voltage Protection (Zener diode clamp)	<table border="0"> <tr> <td>3.3V output</td> <td>3.9V</td> </tr> <tr> <td>5V output</td> <td>6.2V</td> </tr> <tr> <td>12V output</td> <td>15V</td> </tr> <tr> <td>15V output</td> <td>18V</td> </tr> <tr> <td>$\pm 5V$ output</td> <td>$\pm 6.2V$</td> </tr> <tr> <td>$\pm 12V$ output</td> <td>$\pm 15V$</td> </tr> <tr> <td>$\pm 15V$ output</td> <td>$\pm 18V$</td> </tr> </table>	3.3V output	3.9V	5V output	6.2V	12V output	15V	15V output	18V	$\pm 5V$ output	$\pm 6.2V$	$\pm 12V$ output	$\pm 15V$	$\pm 15V$ output	$\pm 18V$
3.3V output	3.9V														
5V output	6.2V														
12V output	15V														
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$\pm 5V$ output	$\pm 6.2V$														
$\pm 12V$ output	$\pm 15V$														
$\pm 15V$ output	$\pm 18V$														
Short Circuit Protection	Indefinite(hiccup) (Automatic Recovery)														
Temperature Coefficient	$\pm 0.02\%/^{\circ}C$														
Capacitive Load (3)	See table														
Transient Recovery Time (4)	250us, typ.														
Transient Response Deviation (4)	$\pm 3\%$, max. Single Output 3.3V: $\pm 5\%$, max.														
INPUT SPECIFICATIONS															
Input Voltage Range	See table														
Under Voltage Lockout															
24V Models	Module ON / OFF 12.6Vdc / 11.4Vdc, typ.														
110V Models	Module ON / OFF 41Vdc / 37Vdc, typ.														
Start up Time (Nominal Vin and constant resistive load)	30mS, typ.														
Input Filter	Pi Type														
Input Current (No-Load)	See table, max.														
Input Current (Full-Load)	See table, typ.														
Input Reflected Ripple Current (5)	20mA _{p-p} , typ.														
Remote On/Off (CTRL) (6)															
ON:	3.0 ... 12Vdc or open circuit														
OFF:	0 ... 1.2Vdc or Short circuit pin1 and pin2/3														
	OFF idle current: 5 mA, typ.														
ABSOLUTE MAXIMUM RATINGS(7)															
These are stress ratings. Exposure of devices to any of these conditions may adversely affect long-term reliability.															
Input Surge Voltage(100mS)															
24 Models	100 Vdc, max.														
110 Models	185 Vdc, max.														
Soldering Temperature (1.5mm from case 10sec max.)	260°C , max.														

GENERAL SPECIFICATIONS	
Efficiency	See table, typ.
I/O Isolation Voltage(60sec)	
Input/Output	3000Vdc
Metal Case/Input&Ouput	1000Vdc
I/O Isolation Capacitance	1000 pF typ.
I/O Isolation Resistance	1000M Ohm
Switching Frequency	24V Modes 330kHz, typ. 110V Modes 220kHz, typ.
Humidity	95% rel H
Reliability Calculated MTBF(MIL-HDBK-217 F)	>800 Khrs
Safety Standard :	IEC/EN 60950-1; EN50155
Safety Approvals :	IEC/EN 60950-1; EN50155

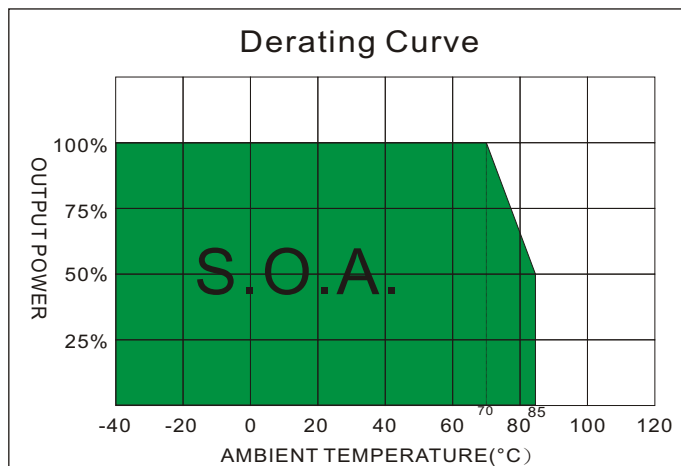
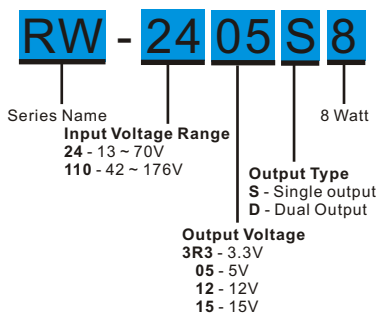
EMC SPECIFICATIONS			
Radiated Emissions	EN50121-3-2	40dBuV from 30-230MHZ 47dBuV from 230-1000MHZ	
Conducted Emissions(8)	EN50121-3-2	99dBuV from 0.15-0.5MHZ 93dBuV from 0.5-30MHZ	
ESD	EN50121-3-2	Air $\pm 8KV$ Contact $\pm 6KV$	Perf. Criteria A
RS	EN50121-3-2	20V/m	Perf. Criteria A
EFT (9)	EN50121-3-2	2.0KV	Perf. Criteria A
Surge (9)	EN50121-3-2	2.0KV	Perf. Criteria A
CS	EN50121-3-2	10V	Perf. Criteria A
PFMF	EN61000-4-8	10A/m	Perf. Criteria A

PHYSICAL SPECIFICATIONS	
Case Material	Nickel-coated Copper
Base Material	Non-conductive Black Plastic(UL94V-0 rated)
Pin Material	$\Phi 0.5mm$ Brass Solder-coated
Potting Material	Epoxy (UL94V-0 rated)
Weight	18g(Metal Case)
Dimensions	1.25"x0.8"x0.4"

ENVIRONMENT SPECIFICATIONS	
Operating Temperature	-40°C~+85°C(See Derating Curve) -40°C~+70°C(For 100% load)
Maximum Case Temperature	105°C
Storage Temperature	-55°C~125°C
Cooling(10)	Nature Convection
Thermal shock	IEC60068
Shock	EN61373
Vibration	EN61373

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PART NUMBER STRUCTURE



MODEL SELECTION GUIDE

MODEL NUMBER	INPUT Voltage Range (Vdc)	INPUT Current		OUTPUT Voltage (Vdc)	OUTPUT Current		EFFICIENCY @FL (%)	Capacitor Load(μF)
		No-Load (mA)	Full Load (mA)		Min. load (mA)	Full load (mA)		
RW-243R3S8	13.0 ~ 70.0VDC or 24.0VDC	30	397.59	3.3	0	2400	83	1330
RW-2405S8	13.0 ~ 70.0VDC or 24.0VDC	20	387.60	5	0	1600	86	1330
RW-2412S8	13.0 ~ 70.0VDC or 24.0VDC	10	391.18	12	0	665	85	330
RW-2415S8	13.0 ~ 70.0VDC or 24.0VDC	10	388.18	15	0	535	86	220
RW-2405D8	13.0 ~ 70.0VDC or 24.0VDC	10	401.61	±5	0	±800	83	±900
RW-2412D8	13.0 ~ 70.0VDC or 24.0VDC	10	394.12	±12	0	±335	85	±220
RW-2415D8	13.0 ~ 70.0VDC or 24.0VDC	10	385.17	±15	0	±265	86	±100
RW-1103R3S8	42.0 ~ 176.0VDC or 110.0VDC	10	88.89	3.3	0	2400	81	1330
RW-11005S8	42.0 ~ 176.0VDC or 110.0VDC	10	86.58	5	0	1600	84	1330
RW-11012S8	42.0 ~ 176.0VDC or 110.0VDC	5	86.36	12	0	665	84	330
RW-11015S8	42.0 ~ 176.0VDC or 110.0VDC	5	87.90	15	0	535	83	220
RW-11005D8	42.0 ~ 176.0VDC or 110.0VDC	5	90.91	±5	0	±800	80	±900
RW-11012D8	42.0 ~ 176.0VDC or 110.0VDC	5	89.14	±12	0	±335	82	±220
RW-11015D8	42.0 ~ 176.0VDC or 110.0VDC	5	87.08	±15	0	±265	83	±100

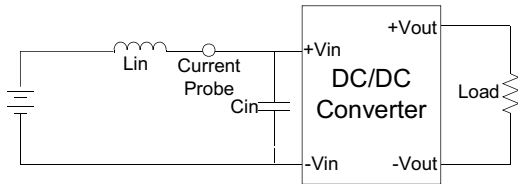
NOTE

- One load is 25% to 100% load, the other load is 100% load, the output voltage variable rate is within ±5%.
- Ripple/Noise Measured with a 0.1μF ceramic capacitor and 10μF electrolytic capacitor.
- Test by nominal input voltage and constant resistor load.
- Tested by normal Vin and 25% load step change (75%-50%-25% of Io) at 1A/μs.
- Measured Input reflected ripple current with a simulated source inductance of 12μH and a source capacitor Cin(33μF, ESR<1.0Ω at 100KHz).
- The remote on/off control pin is referenced to -Vin(pin2,pin3).
- Exceeding the absolute ratings of the unit could cause damage. It is not allowed for continuous operating.
- Input filter components are used to help meet conducted emissions 79dBuV from 0.15-0.5MHZ and 73dBuV from 0.5-30MHZ requirement for the module,
Which application refer to the EMI Filter of design & feature configuration.
- An external filter capacitor is required if the module has to meet EFT and Surge in EN50121-3-2.
The filter capacitor Motien suggest:
RW-24XXX : one electrolytic capacitor (Nippon - chemi - con KY series, 330 μF/100V).
RW-110XXX : two electrolytic capacitors (Ruby-con BXF series, 100 μF/250V) in parallel.
- "Nature Convection" is usually about 30-65 LFM but is not equal to still air (0 LFM).

TEST CONFIGURATIONS

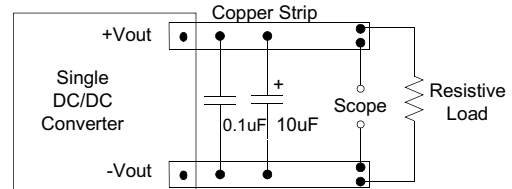
Input Reflected Ripple Current Test Step

Input reflected ripple current is measured through a source inductor L_{in} (12uH) and a source capacitor C_{in} (33uF, ESR<1.0Ω at 100KHz) at nominal input and full load.



Output Ripple & Noise Measurement Test

Use a 0.1uF ceramic capacitor and a 10uF electrolytic capacitor measurement. The Scope measurement bandwidth is 0-20MHz.



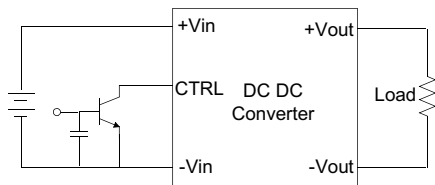
DESIGN & FEATURE CONFIGURATIONS

CTRL Module ON / OFF

Positive logic turns on the module during high logic and off during low logic.

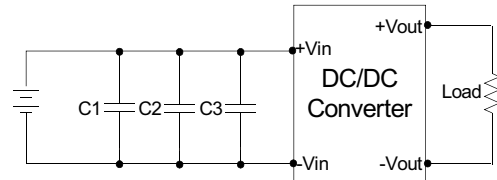
Ctrl module on/off can be controlled by an external switch between the ctrl terminal and -Vin terminal. The switch can be an open collector or open drain

For positive logic if the ctrl feature is not used, please leave the ctrl pin floating.



EMI Filter

Input filter components (C1,C2,C3) are used to help meet conducted emissions 79dBuV from 0.15-0.5MHz and 73dBuV from 0.5-30MHz requirement for the module. These components should be mounted as close as possible to the module; and all leads should be minimized to decrease radiated noise.



	C1、C2、C3
RW-24XXXX	None
RW-110XXX	MLCC,1uF, 250V

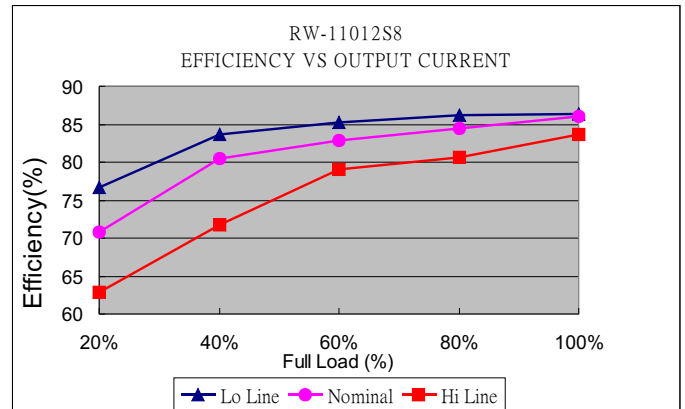
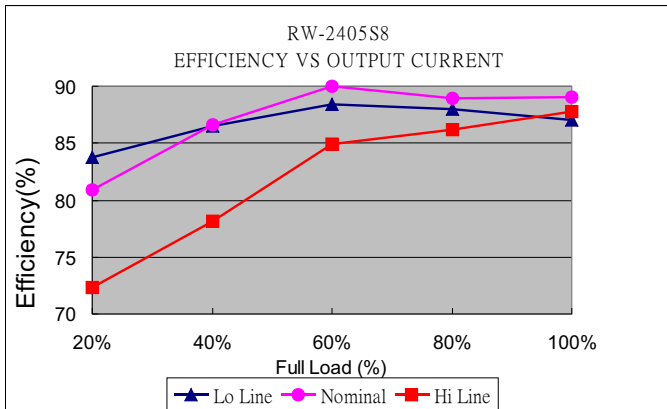
Over Voltage Protection

The module includes an internal output over voltage protection circuit, which monitors the voltage on the output terminals. If this voltage exceeds the over voltage set point, the module will activate the control loop of internal circuit to clamp the output voltage.

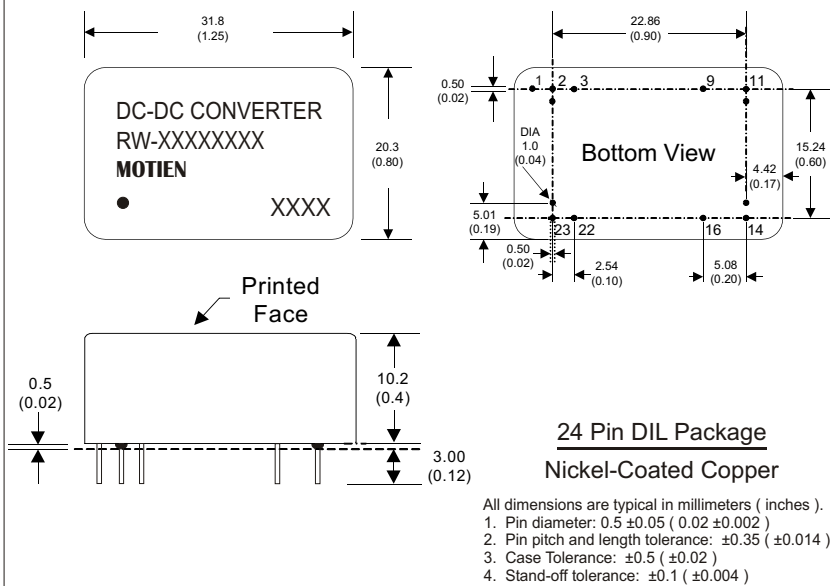
Over Current Protection

The module includes an internal over current protection circuit, which will endure current limiting for an unlimited duration during output over load condition. If the output current exceeds the OCP set point, the module will shut down automatically (hiccup). The module will try to restart after shut down. If the over load condition still exists, the module will shut down again.

ELECTRICAL CHARACTERISTIC CURVES



MECHANICAL SPECIFICATIONS



PIN CONNECTIONS		
PIN NUMBER	SINGLE	DUAL
1	CTRL	CTRL
2	-V Input	-V Input
3	-V Input	-V Input
9	N.P.	Common
11	N.C.	-V Output
14	+V Output	+V Output
16	-V Output	Common
22	+V Input	+V Input
23	+V Input	+V Input