

# RV8-S/D60W

60W Regulated Single & Dual Output DC/DC Converter



Picture similar



- 2" x 1" Package
- Wide 4:1 Input Range
- 1600VDC Isolation
- No Minimum Load Required
- Efficiency up to 93%
- Operating Temperature Range -40°C ~ +100°C max.
- Continuous Short Circuit Protection
- Over Current Protection, Over and Under Voltage Protection
- Metal Case, Optional with Heat-sink
- Soft Start, Adjustable Output
- Remote On/Off Control

## Output Specifications

Voltage Accuracy	±1%, max.
Output Voltage Adjustability (Trim)	Single Output: ±10% max.
Maximum Output Current	See table
Line Regulation	Single & Dual ±0.5% max.
Load Regulation	from 0% to 100% Load: ±0.5% max. Dual: ±1%, max.(balanced load)
Cross Regulation (Dual Output)	±5%
Over Voltage Protection	120 ~ 125% of Vout typ.
Over Current Protection	120 ~ 140% of Iout max.
Short Circuit Protection	Indefinite (hiccup) (Automatic Recovery)
Ripple & Noise (20 MHz bandwidth)	100mV pk-pk max.
Temperature Coefficient	±0.02%/°C
Transient Recovery Time	250µs typ.
Transient Response Deviation	±3% max.

## Environmental Specifications

Operating Temperature Range	-40°C ~ +100°C (see Derating Curve)
Maximum Case Temperature	110°C
Storage Temperature	-55°C ~ +125°C
Cooling	Natural Convection (optional Heat-sink)
Soldering Profile and Peak Temperature	Wave Flow: 260°C (1.5 mm from case), 10s, max.

## Physical Specifications

Case Material	Copper Black Base Material: Non-conductive Black Plastic (UL94V-0 rated)
Pin Material	1.0mm Brass Solder-coated
Potting Material	Epoxy (UL94V-0 rated)
Weight	45.0g
Case Dimensions	2.00" x 1.00" x 0.45"

## EMC Specifications

Radiated / Conducted Emissions	EN55032 Class A see EMI Filter
ESD	IEC 61000-4-2 Perf.Criteria A
Rad. RF	IEC 61000-4-3 Perf.Criteria A
EFT	IEC 61000-4-4 Perf.Criteria A
Surge	IEC 61000-4-5 Perf.Criteria A
Cond. RF	IEC 61000-4-6 Perf.Criteria A
PFMF	IEC 61000-4-8 Perf.Criteria A
VD/SI/VV	-

## Input Specifications

Voltage Range	See table
Start-up Time	60ms typ.
No-Load/Full-Load Input Current	See table
Input Filter	C/L (see filter details on following pages)
Input Reflected Ripple Current	20mA pk-pk typ.
Remote ON	3.0 ~ 12VDC or open circuit
Remote OFF	0 ~ 1.2VDC or short circuit pin 2 and 3
OFF Idle Current	5mA typ.
Surge Voltage (100 ms) <sup>†</sup>	
12V Models	25VDC max.
24V Models	50VDC max.
48V Models	100VDC max.

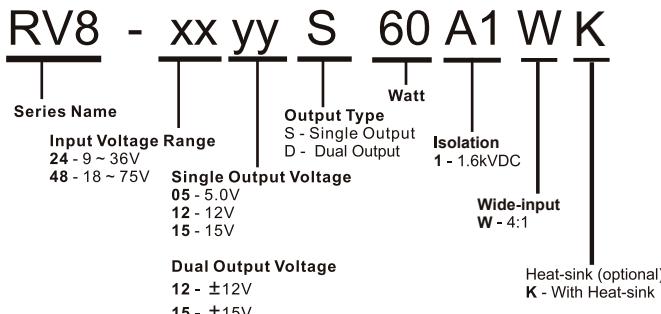
## General Specifications

I/O Isolation Voltage (60 sec)	1600VDC
Isolation Voltage Metal Case/Input&Output	1600VDC
I/O Isolation Capacitance	2200pF typ.
I/O Isolation Resistance	1000M Ohm, min
Switching Frequency	225kHz typ.
Humidity	95% rel H
Reliability Calculated MTBF	>210Khrs (MIL-HDBK-217 f)
Safety Standard(s)	UL60950-1 (approval), UL62368-1 (meet)

<sup>†</sup> These are stress ratings; exposure of devices to any of these conditions may adversely affect long-term reliability.  
All specifications typical at  $T_A = 25^\circ\text{C}$ , nominal input voltage and full load, unless otherwise specified.

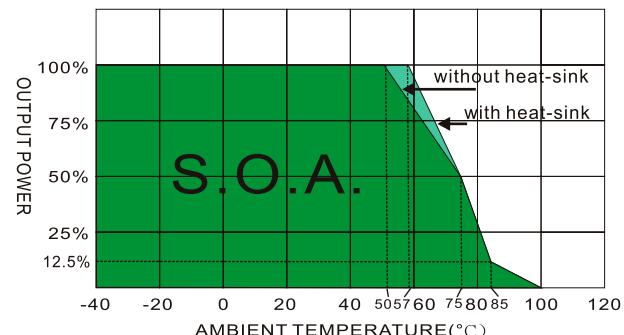
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Part Number Structure



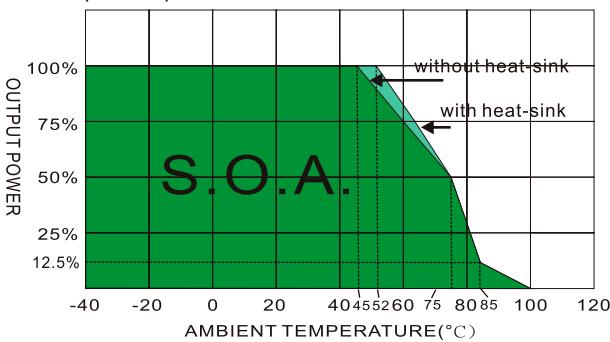
Derating Curve

(all models ex. 2405S60 & 48yyD60)



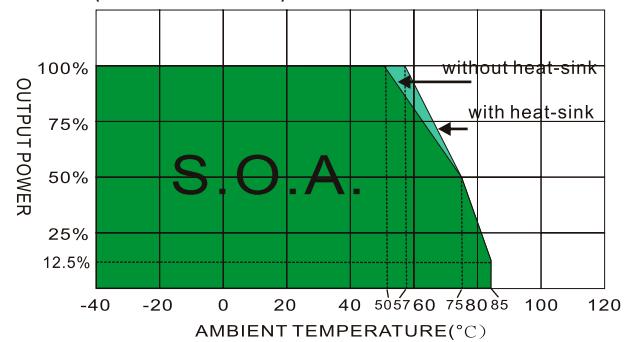
Derating Curve

(2405S60)



Derating Curve

(4812D60 & 4815D60)



## MODEL SELECTION GUIDE

MODEL NUMBER	INPUT Voltage Range	INPUT No-Load Current	INPUT Full Load Current	OUTPUT Voltage	OUTPUT Full load Current	EFFICIENCY	CAPACITOR
	(Vdc)	(mA)	(mA)	(Vdc)	(mA)	@FL(%)	Load(µF)
RV8-2405S60A1W	9-36, 24V Nominal	25	2703	5	12000	92.5	30000
RV8-2412S60A1W	9-36, 24V Nominal	25	2703	12	5000	92.5	5850
RV8-2415S60A1W	9-36, 24V Nominal	25	2688	15	4000	93	3900
RV8-4805S60A1W	18-75, 48V Nominal	25	1344	5	12000	93	30000
RV8-4812S60A1W	18-75, 48V Nominal	25	1351	12	5000	92.5	5850
RV8-4815S60A1W	18-75, 48V Nominal	25	1344	15	4000	93	3900
RV8-2412D60A1W	9-36, 24V Nominal	40	2747	±12	±2500	91	±3900
RV8-2415D60A1W	9-36, 24V Nominal	50	2747	±15	±2000	91	±2400
RV8-4812D60A1W	18-75, 48V Nominal	40	1373	±12	±2500	91	±3900
RV8-4815D60A1W	18-75, 48V Nominal	50	1373	±15	±2000	91	±2400

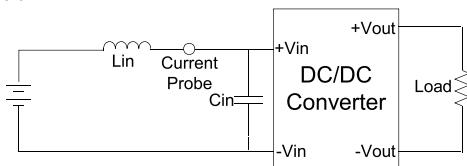
Notes:

1. Dual: One load is 25% to 100% load, the other load is 100% load, the output voltage variable rate is within ±5%.
  2. Measured with 20MHz bandwidth and 1.0µF ceramic capacitor.
  3. Tested at minimal Vin and constant resistive load.
  4. Tested at normal Vin and 25% load step change (75%-50%-25% of Io).
  5. Measured Input reflected ripple current with a simulated source inductance of 1µH and a source capacitor Cin (22µF, ESR<1.0Ω at 100KHz).
  6. The remote on/off control pin is referenced to -Vin (pin2).
  7. „Natural Convection“ is usually about 30-65 LFM but is not equal to still air (0 LFM).
  8. Exceeding the absolute ratings of the unit could cause damage. It is not allowed for continuous operating.
  9. The RV8-60W series can meet EN55032 Class A with an external filter in parallel with the input pins.
  10. An external filter capacitor is required if the module has to meet EN61000-4-4, EN61000-4-5.
- The RV8-24yyS/D60A1W recommends an aluminum electrolytic capacitor (Nippon chemi-con KY series, 330µF/100V) and a TVS (SMDJ58A, 58V, 3000Watt peak pulse power) to connect in parallel.
- The RV8-48yyS/D60A1W recommends an aluminum electrolytic capacitor (Nippon chemi-con KY series, 330µF/100V) and a TVS (SMDJ120A, 120V, 3000Watt peak pulse power) to connect in parallel.

## TEST CONFIGURATIONS

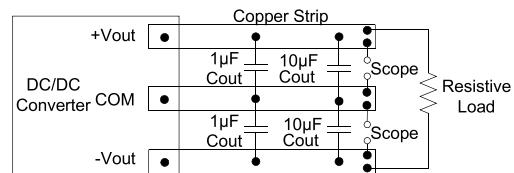
### Input Reflected Ripple Current Test Step

Input reflected ripple current is measured through a source inductor  $L_{in}$ ( $1\mu H$ ) and a source capacitor  $C_{in}$ ( $22\mu F$ , ESR< $1.0\Omega$  at 100KHz) at nominal input and full load.



### Output Ripple & Noise Measurement Test

To reduce ripple and noise, it is recommended to use a  $1\mu F$  ceramic disk capacitor and a  $10\mu F$  ceramic disk capacitor to at the output.



## DESIGN & FEATURE CONFIGURATIONS

### 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 Temperature Protection

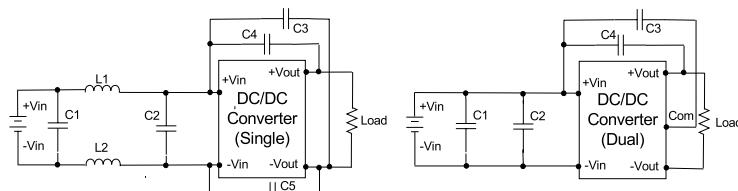
The over temperature protection consists of circuitry that provides protection from thermal damage. If the temperature exceeds the over temperature threshold the module will shut down.

The module will try to restart after shut down, If the over temperature condition still exists during restart, the module will shut down again. This restart trial will continue until the temperature is within specification.

### EMI Filter

Input filter components ( $C_1$ ~ $C_5$ ,  $L_1$ / $L_2$ ) are used to help meet conducted emissions .

These components should be mounted as close as possible to the module; and all leads should be minimized to decrease radiated noise.



Single	C1	L1/L2	C2	C3	C4	C5
24V in	1812.47μF, 50V	12μH	1812.47μF, 50V	1206.470pF, 2kV	1206.1000pF, 2kV	1206.1000pF, 2kV
48V in	1812.1.5μF, 100V	12μH	1812.1.5μF, 100V	1206.470pF, 2kV	1206.1000pF, 2kV	1206.1000pF, 2kV

Dual	C1	C2	C3	C4
24V in	1812.47μF, 50V	1812.47μF, 50V	1206.220pF, 2kV	1206.1500pF, 2kV
48V in	1812.1.5μF, 100V	1812.1.5μF, 100V	1206.220pF, 2kV	1206.1500pF, 2kV

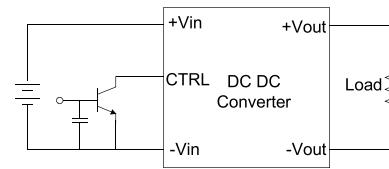
### Over Current Protection

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).

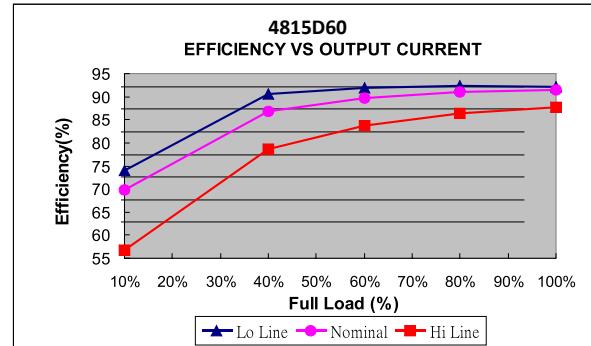
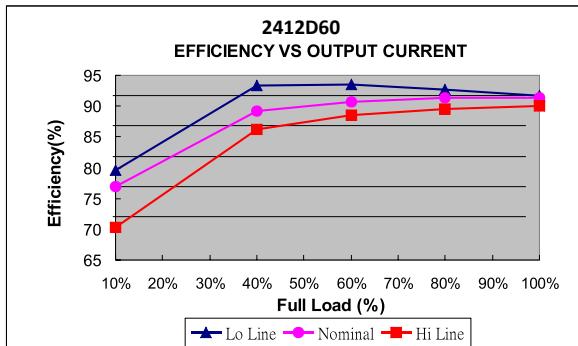
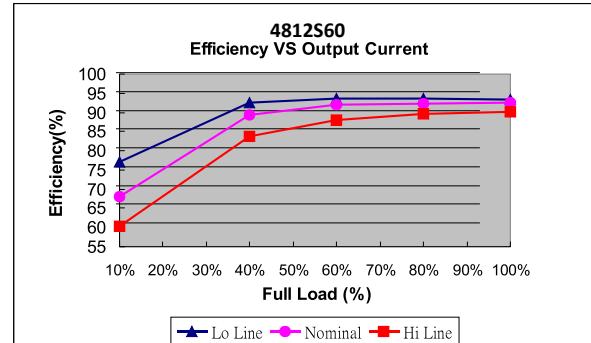
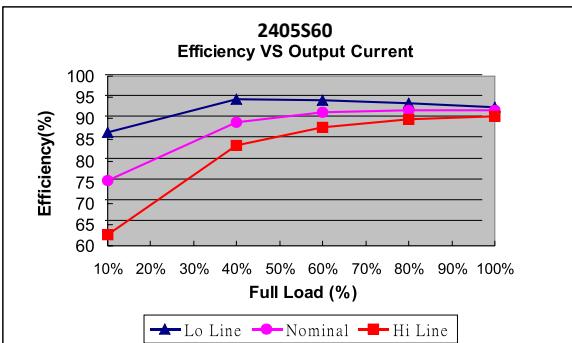
The module will try to restart after shut down. If the over load condition still exists, the module will shut down again.

### 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.

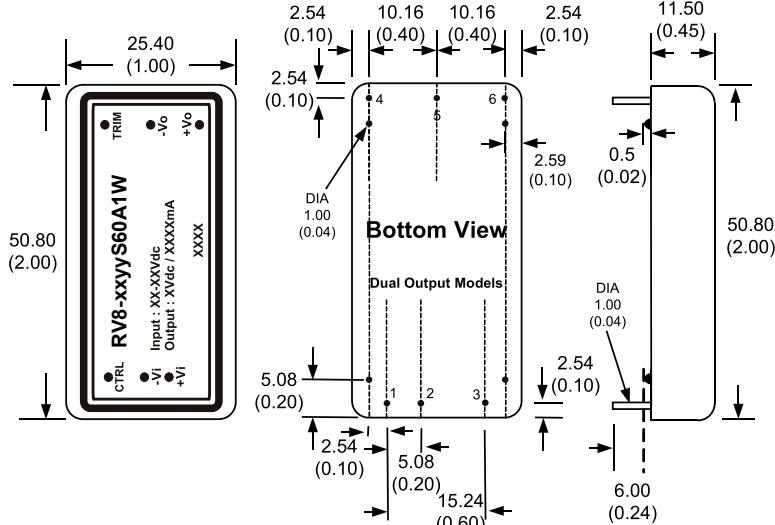


Electrical Characteristic Curves



**RV8-S/D60W**

## Mechanical Specifications



All dimensions are typical in millimeters ( inches ).

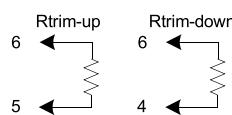
- All dimensions are typical in millimeters ( inches ).

  1. Pin diameter:  $1.0 \pm 0.05$  (  $0.04 \pm 0.002$  )
  2. Pin pitch and length tolerance:  $\pm 0.35$  (  $\pm 0.014$  )
  3. Case Tolerance:  $\pm 0.5$  (  $\pm 0.02$  )
  4. Stand-off Tolerance:  $\pm 0.1$  (  $\pm 0.004$  )

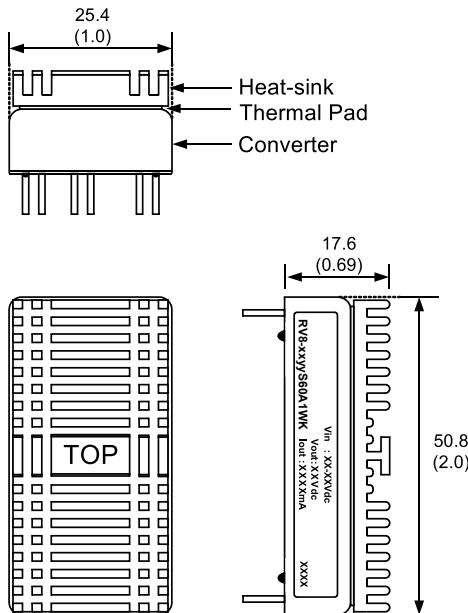
PIN CONNECTIONS		
PIN NUMBER	SINGLE	DUAL
1	+Vin	+Vin
2	-Vin	-Vin
3	CTRL	CTRL
4	+Vout	+Vout
5	-Vout	Com
6	Trim	-Vout

## EXTERNAL OUTPUT TRIMMING

Output can be externally trimmed by using the method as below. (single output models only )



## With Heat-sink



Order code: RV8-xxxyS/D60A1WK (includes heat-sink & thermal pad)  
Material: Aluminum  
Finish: Anodic treatment (black)  
Weight: 11g (0.39oz) (without converter)

Note: Converters will be supplied with heat-sinks already mounted.

*The models listed above are standard types. If you need special specifications or have questions regarding packing (Tube or Tape&Reel) or need application support, please contact our specialists: sales@rsa-electronic.de or +49 69-984047-0*