

# CNJ30HW Series

30W 4:1 Regulated Single & Dual output



## Features

- Wide 4:1 Input Range
- Isolation Voltage up to 5000VAC
- Reinforced Insulation for 250Vrms Working Voltage
- Efficiency up to 89%
- Under Voltage Lockout
- Remote On/Off Control
- Adjustable Output Voltage
- Continuous Short Circuit Protection
- Over Current Protection
- Over Voltage Protection
- Over Temperature Protection



## PART NUMBER STRUCTURE

**CNJ 30 H W - 24 05 S**  
(1) (2) (3) (4) (5) (6) (7)

### (1) Series

### (2) Watt

30 - 30 W

### (3) High Isolation

### (4) Wide Input Range

W - 4 : 1

### (5) Input Voltage Range

24 - 9-36 V

36 - 18-75 V

### (6) Output Voltage

05 - 5.0 V

12 - 12 V

15 - 15 V

### (7) Output Type

S - Single Output

D - Dual Output

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ALL SPECIFICATIONS ARE TYPICAL AT 25°C, NOMINAL INPUT AND FULL LOAD UNLESS OTHERWISE NOTED

| MODEL NUMBER  | INPUT<br>Voltage Range<br>(VDC) | INPUT Current         |                         | OUTPUT<br>Voltage<br>(VDC) | OUTPUT Current    |                   | EFFICIENCY<br>@FL<br>(%, typ.) | Capacitive<br>Load @FL<br>(μF, max.) |
|---------------|---------------------------------|-----------------------|-------------------------|----------------------------|-------------------|-------------------|--------------------------------|--------------------------------------|
|               |                                 | No-Load<br>(mA, typ.) | Full Load<br>(mA, typ.) |                            | Min. load<br>(mA) | Full load<br>(mA) |                                |                                      |
| CNJ30HW-2405S | 9-36                            | 10                    | 1453                    | 5                          | 0                 | 6000              | 86                             | 7200                                 |
| CNJ30HW-2412S | 9-36                            | 10                    | 1437                    | 12                         | 0                 | 2500              | 87                             | 1200                                 |
| CNJ30HW-2415S | 9-36                            | 10                    | 1404                    | 15                         | 0                 | 2000              | 89                             | 1000                                 |
| CNJ30HW-2405D | 9-36                            | 10                    | 1488                    | ±5                         | 0                 | ±3000             | 84                             | ±3600                                |
| CNJ30HW-2412D | 9-36                            | 10                    | 1437                    | ±12                        | 0                 | ±1250             | 87                             | ±750                                 |
| CNJ30HW-2415D | 9-36                            | 10                    | 1404                    | ±15                        | 0                 | ±1000             | 89                             | ±500                                 |
| CNJ30HW-4805S | 18-75                           | 10                    | 718                     | 5                          | 0                 | 6000              | 87                             | 7200                                 |
| CNJ30HW-4812S | 18-75                           | 10                    | 710                     | 12                         | 0                 | 2500              | 88                             | 1200                                 |
| CNJ30HW-4815S | 18-75                           | 10                    | 702                     | 15                         | 0                 | 2000              | 89                             | 1000                                 |
| CNJ30HW-4805D | 18-75                           | 10                    | 744                     | ±5                         | 0                 | ±3000             | 84                             | ±3600                                |
| CNJ30HW-4812D | 18-75                           | 10                    | 718                     | ±12                        | 0                 | ±1250             | 87                             | ±750                                 |
| CNJ30HW-4815D | 18-75                           | 10                    | 702                     | ±15                        | 0                 | ±1000             | 89                             | ±500                                 |

| INPUT SPECIFICATIONS                                                                                             |                                            |            |         |      |      |         |
|------------------------------------------------------------------------------------------------------------------|--------------------------------------------|------------|---------|------|------|---------|
| Parameter                                                                                                        | Conditions                                 |            | Min.    | Typ. | Max. | Unit    |
| Input Voltage Range                                                                                              | 24V Input                                  |            | 9       | 24   | 36   | VDC     |
|                                                                                                                  | 48V Input                                  |            | 18      | 48   | 75   |         |
| Under Voltage Lockout                                                                                            | 24V Input                                  | Module ON  |         | 8.2  |      | VDC     |
|                                                                                                                  |                                            | Module OFF |         | 7.5  |      |         |
|                                                                                                                  | 48V Input                                  | Module ON  |         | 17.4 |      |         |
|                                                                                                                  |                                            | Module OFF |         | 16.0 |      |         |
| Input Filter                                                                                                     |                                            |            | Pi Type |      |      |         |
| Input Reflected Ripple Current (1)                                                                               |                                            |            |         | 20   |      | mApk-pk |
| Start up Time                                                                                                    | Nominal Vin and constant resistive load    |            |         | 20   |      | ms      |
| Remote ON/OFF Control (2)                                                                                        | Module ON (Open Circuit)                   |            | 3.0     |      | 12   | VDC     |
|                                                                                                                  | Module OFF (Short circuit pin 2 and pin 6) |            | 0       |      | 1.2  | VDC     |
|                                                                                                                  | OFF Idle Input Current                     |            |         | 2.5  |      | mA      |
|                                                                                                                  | CTRL Pin Input Current                     |            |         |      | 1.0  | mA      |
| Recommended input fuse ( slow blow )                                                                             | 24V Input                                  |            | 6.3     |      |      | A       |
|                                                                                                                  | 48V Input                                  |            | 3.15    |      |      |         |
| Note :                                                                                                           |                                            |            |         |      |      |         |
| 1. Measured with a simulated source inductance of 12μH and a source capacitor Cin ( 47μF, ESR<1.0Ω at 100 kHz ). |                                            |            |         |      |      |         |
| 2. The remote on/off control pin is referenced to –Vin ( pin2 ).                                                 |                                            |            |         |      |      |         |

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## ABSOLUTE MAXIMUM RATINGS

| Parameter                       | Conditions                 | Min. | Typ. | Max. | Unit |
|---------------------------------|----------------------------|------|------|------|------|
| Input Surge Voltage ( 1000 ms ) | 24V Input                  |      |      | 50   | VDC  |
|                                 | 48V Input                  |      |      | 100  |      |
| Soldering Temperature           | 1.5mm from case 10sec max. |      |      | 260  | °C   |

Note : These are stress ratings. Exposure of devices to any of these conditions may adversely affect long-term reliability.

## OUTPUT SPECIFICATIONS

| Parameter                                           | Conditions                                                       |                  | Min.                                         | Typ. | Max.  | Unit    |
|-----------------------------------------------------|------------------------------------------------------------------|------------------|----------------------------------------------|------|-------|---------|
| Output Voltage Accuracy                             |                                                                  |                  | -1.0                                         |      | +1.0  | %       |
| Output Voltage Adjustability ( Trim )               | Single Output                                                    |                  | -10                                          |      | +10   | %       |
| Line Regulation                                     | Single Output                                                    |                  | -0.2                                         |      | +0.2  | %       |
|                                                     | Dual Output                                                      |                  | -0.5                                         |      | +0.5  |         |
| Load Regulation                                     | From 0% to 100% Load                                             | Single Output    | -0.5                                         |      | +0.5  | %       |
|                                                     |                                                                  | Dual Output      | -1.0                                         |      | +1.0  |         |
| Cross Regulation                                    | Asymmetrical Load 25% / 100% for Dual Output                     |                  | -5                                           |      | +5    | %       |
| Ripple & Noise(1)                                   | 20MHz bandwidth                                                  | 5V Output        |                                              | 50   |       | mVpk-pk |
|                                                     |                                                                  | 12V & 15V Output |                                              | 75   |       |         |
| Over Voltage Protection<br>(Zener diode clamp)      | 5V Output                                                        |                  |                                              | 6.2  |       | VDC     |
|                                                     | 12V Output                                                       |                  |                                              | 15   |       |         |
|                                                     | 15V Output                                                       |                  |                                              | 18   |       |         |
| Over Current Protection                             |                                                                  |                  |                                              | 150  |       | % of FL |
| Short Circuit Protection                            |                                                                  |                  | Indefinite ( hiccup ) ( Automatic Recovery ) |      |       |         |
| Temperature Coefficient                             |                                                                  |                  | -0.02                                        |      | +0.02 | %/°C    |
| Capacitive Load                                     | Minimum Vin and constant resistive load                          |                  | See Table                                    |      |       |         |
| Transient Recovery Time                             | Nominal Vin and<br>25% load step change<br>( 75%-50%-25% of Io ) |                  |                                              | 250  |       | µs      |
| Transient Response Deviation                        |                                                                  | 5V Output        |                                              | 5    |       | %       |
|                                                     |                                                                  | 12V & 15V Output |                                              | 3    |       |         |
| Note :<br>1. Measured With a 10µFceramic capacitor. |                                                                  |                  |                                              |      |       |         |

## GENERAL SPECIFICATIONS

| Parameter                | Conditions                        | Min.                  | Typ. | Max. | Unit    |
|--------------------------|-----------------------------------|-----------------------|------|------|---------|
| Isolation Voltage        | Input-output, and rated for 60sec | 5000                  |      |      | VAC     |
| Isolation Resistance     | Input-output                      | 1000                  |      |      | MΩ      |
| Isolation Capacitance    | Input-output                      |                       | 20   |      | pF      |
| Clearance / Creepage     | Input-output                      | 8                     |      |      | mm      |
| Leakage Current          | 240VAC, 60Hz                      |                       | 2    |      | µA      |
| Switching Frequency      |                                   |                       | 275  |      | k Hz    |
| MTBF                     | MIL-HDBK-217 F @ 25°C             | 300                   |      |      | k hours |
| Safety Standard          | IEC / EN / UL 62368-1             | DK-136001-UL, E252573 |      |      |         |
| Insulation System        |                                   | Reinforced Insulation |      |      |         |
| Environmental compliance |                                   | RoHS                  |      |      |         |

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## ENVIRONMENT SPECIFICATIONS

| Parameter                     | Conditions             | Min.      | Typ. | Max. | Unit     |
|-------------------------------|------------------------|-----------|------|------|----------|
| Operating Ambient Temperature | See the Derating Curve | -40       |      | 100  | °C       |
| Maximum Case Temperature      |                        |           |      | 105  | °C       |
| Thermal Impedance             |                        | 11        |      |      | °C/W     |
| Over Temperature Protection   | Case Temperature       |           | 115  |      | °C       |
| Storage Humidity              |                        |           |      | 95   | % rel. H |
| Storage Temperature           |                        | -55       |      | 125  | °C       |
| Cooling                       | Nature Convection      | 30-65 LFM |      |      |          |

## EMC SPECIFICATIONS

| Parameter           | Standard      | Condition                           | Criterion |
|---------------------|---------------|-------------------------------------|-----------|
| Conducted Emissions | EN55032       | without external components         | A         |
| Radiated Emissions  | EN55032       | without external components         | A         |
| ESD                 | IEC 61000-4-2 | Air $\pm 15$ kV, Contact $\pm 8$ kV | A         |
| RS                  | IEC 61000-4-3 | 10V/m                               | A         |
| EFT                 | IEC 61000-4-4 | $\pm 2$ kV with external components | A         |
| Surge               | IEC 61000-4-5 | $\pm 2$ kV with external components | A         |
| CS                  | IEC 61000-4-6 | 10Vrms                              | A         |
| PFMF                | IEC 61000-4-8 | 100A/m                              | A         |

## PHYSICAL SPECIFICATIONS

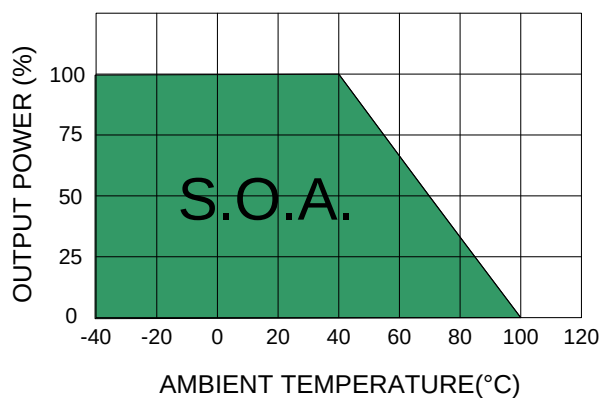
| Parameter        | Value                                         |
|------------------|-----------------------------------------------|
| Case Material    | Nonconductive Black Plastic ( UL94V-0 rated ) |
| Base Material    | Nonconductive Black Plastic ( UL94V-0 rated ) |
| Pin Material     | $\Phi 1.0$ mm Brass Solder-coated             |
| Potting Material | Silicone ( UL94V-0 rated )                    |
| Weight           | 30 g, typ.                                    |
| Dimensions       | 2.00" x 1.00" x 0.40"                         |

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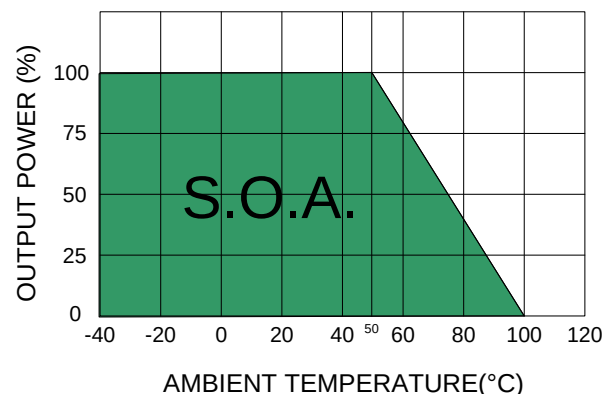
## ELECTRICAL CHARACTERISTIC CURVES

Derating Curve



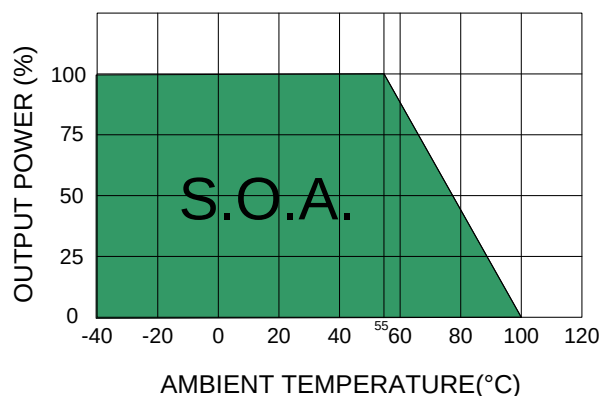
Dual Output 5V Models

Derating Curve



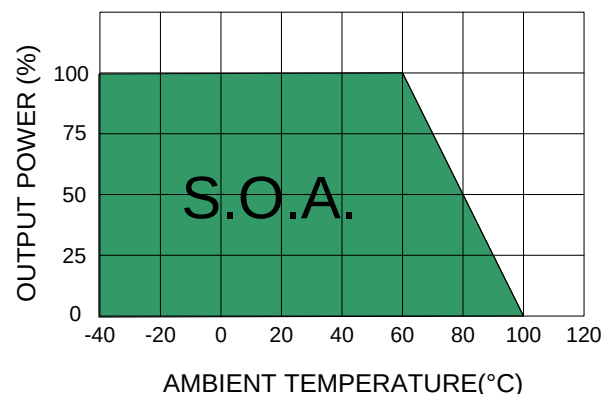
Single Output 5V Models

Derating Curve



Single & Dual Output 12V Models

Derating Curve

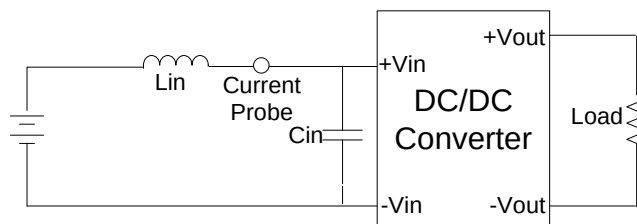


Single & Dual Output 15V Models

## TEST CONFIGURATIONS

### Input Reflected Ripple Current Test Step

Input reflected ripple current is measured with a source inductor  $L_{in}$  (12 $\mu$ H) and a source capacitor  $C_{in}$  (47 $\mu$ F, ESR<1.0 $\Omega$  at 100KHz) at nominal input and full load.



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## DESIGN & FEATURE CONFIGURATIONS

### 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.

### 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 Test

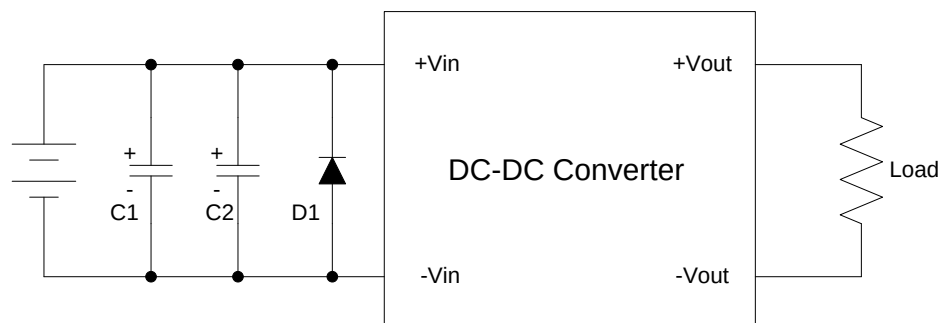
The over temperature protection consists of circuitry that provides protection from thermal damage. If the temperature exceeds the over temperature threshold the module will shut down. The module will try to restart after shut down, if the over temperature condition still exists during restart, the module will shut down again. This restart trial will continue until the temperature is within specification.

### Remote Module ON / OFF

Positive logic turns on the module during high logic and off during low logic. Remote module on/off can be controlled by an external switch between the CTRL terminal and -Vin terminal. For positive logic if the remote feature is not used, please leave the CTRL pin floating.

### EMC Filter

The Circuit is used to meet Surge & EFT test.



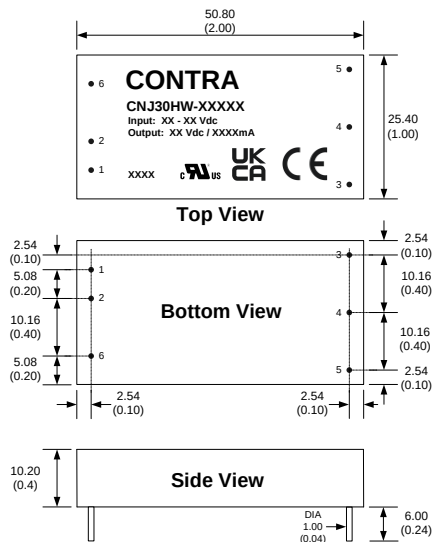
|               | C1 、 C2<br>NIPPON Chemi-con KY Series | D1       |
|---------------|---------------------------------------|----------|
| CNJ30HW-24XXX | 470uF, 100V                           | SMDJ58A  |
| CNJ30HW-48XXX | 220uF, 100V                           | SMDJ120A |

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## MECHANICAL SPECIFICATIONS



Notes : All dimensions are typical in millimeters ( inches ).

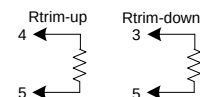
1. Pin diameter:  $1.0 \pm 0.05$  (  $0.02 \pm 0.002$  )
2. Pin pitch and length tolerance:  $\pm 0.35$  (  $\pm 0.014$  )
3. Case Tolerance:  $\pm 0.5$  (  $\pm 0.02$  )

## PIN CONNECTIONS

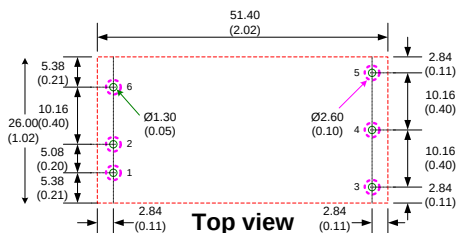
| PIN NUMBER | SINGLE | DUAL  |
|------------|--------|-------|
| 1          | +Vin   | +Vin  |
| 2          | -Vin   | -Vin  |
| 3          | +Vout  | +Vout |
| 4          | -Vout  | COM   |
| 5          | Trim   | -Vout |
| 6          | CTRL   | CTRL  |

## EXTERNAL OUTPUT TRIMMING

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



## RECOMMEND FOOTPRINT DETAILS



Notes : 1. All dimensions are typical in mm (inches).

- Through hole 1 ~ 6:  $\varnothing 1.30$  (0.051)
- Top view pad 1 ~ 6:  $\varnothing 1.50$  (0.059)
- Bottom view pad 1 ~ 6:  $\varnothing 2.60$  (0.102)
2. There should be at least 8mm distance between primary and secondary circuit.