



# EC5DAW SERIES 10 WATT 4:1 INPUT ISOLATED DC-DC CONVERTER

## Features

- Efficiency Up to 89%
- Fixed Switching Frequency
- Regulated Outputs
- Negative Remote On/Off
- 3000Vdc I/O Isolation
- Continuous Short Circuit Protection
- Safety Meets IEC/EN/UL 62368-1
- Shock & Vibration MIL-STD-810F Compliant



| MODEL NUMBER  | INPUT VOLTAGE | OUTPUT VOLTAGE | OUTPUT CURRENT |         | INPUT CURRENT |           | % EFF. |      | CAPACITOR LOAD MAX. |
|---------------|---------------|----------------|----------------|---------|---------------|-----------|--------|------|---------------------|
|               |               |                | MIN.           | MAX.    | NO LOAD       | FULL LOAD | (2)    | (1)  |                     |
| EC5DAW-24S33N | 9-36 VDC      | 3.3 VDC        | 0 mA           | 2000 mA | 6 mA          | 342 mA    | 80     | 80.5 | 2000uF              |
| EC5DAW-24S05N | 9-36 VDC      | 5 VDC          | 0 mA           | 2000 mA | 6 mA          | 496 mA    | 83     | 84   | 2000uF              |
| EC5DAW-24S12N | 9-36 VDC      | 12 VDC         | 0 mA           | 833 mA  | 6 mA          | 471 mA    | 88.5   | 88.5 | 833uF               |
| EC5DAW-24S15N | 9-36 VDC      | 15 VDC         | 0 mA           | 666 mA  | 6 mA          | 468 mA    | 88     | 89   | 666uF               |
| EC5DAW-24D12N | 9-36 VDC      | ±12 VDC        | 0 mA           | ±417 mA | 7 mA          | 471 mA    | 87.5   | 88.5 | 417uF               |
| EC5DAW-24D15N | 9-36 VDC      | ±15 VDC        | 0 mA           | ±333 mA | 7 mA          | 473 mA    | 87     | 88   | 333uF               |
| EC5DAW-48S33N | 18-74 VDC     | 3.3 VDC        | 0 mA           | 2000 mA | 6 mA          | 173 mA    | 79     | 79.5 | 2000uF              |
| EC5DAW-48S05N | 18-74 VDC     | 5 VDC          | 0 mA           | 2000 mA | 6 mA          | 248 mA    | 83     | 84   | 2000uF              |
| EC5DAW-48S12N | 18-74 VDC     | 12 VDC         | 0 mA           | 833 mA  | 6 mA          | 238 mA    | 87.5   | 87.5 | 833uF               |
| EC5DAW-48S15N | 18-74 VDC     | 15 VDC         | 0 mA           | 666 mA  | 6 mA          | 237 mA    | 88     | 88   | 666uF               |
| EC5DAW-48D12N | 18-74 VDC     | ±12 VDC        | 0 mA           | ±417 mA | 6 mA          | 240 mA    | 87     | 87   | 417uF               |
| EC5DAW-48D15N | 18-74 VDC     | ±15 VDC        | 0 mA           | ±333 mA | 6 mA          | 238 mA    | 86.5   | 87.5 | 333uF               |

NOTE:

1. Nominal Input Voltage 24 or 48VDC
2. Measured at 12VDC for 24Vin, 24VDC for 48Vin
3. For 3.3Vo and 5Vo has Derating by Input is Required

## PART NUMBER

| Series | Nominal Input Voltage      | Number of Outputs | Nominal Output Voltage                                 | Remote On/Off Logic |
|--------|----------------------------|-------------------|--|---------------------|
| EC5DAW | II                         | O                 | XX   | N : Negative        |
| EC5DAW | 24 : 24 VDC<br>48 : 48 VDC | S : Single        | 33 : 3.3VDC<br>05 : 5.0VDC<br>12 : 12VDC<br>15 : 15VDC |                     |
|        |                            | D : Dual          | 12 : ±12 VDC<br>15 : ±15 VDC                           |                     |

Part Number Example:

**EC5DAW-24S12N:** 10W, 4:1 9-36Vdc Input, Single 12Vdc Output, Negative Logic



# EC5DAW Series

## TECHNICAL SPECIFICATIONS

(All specifications are typical at nominal input, full load at 25°C unless otherwise noted.)

### ABSOLUTE MAXIMUM RATINGS

| PARAMETER                     | NOTES and CONDITIONS             | Device                                 | Min. | Typ. | Max. | Units           |
|-------------------------------|----------------------------------|--|------|------|------|-----------------|
| Input Voltage                 | Continuous                       | 24Vin                                  | -0.3 |      | 36   | V <sub>dc</sub> |
|                               |                                  | 48Vin                                  | -0.3 |      | 74   |                 |
| Input Surge Voltage           | 100ms max.                       | 24Vin                                  |      |      | 50   | V <sub>dc</sub> |
|                               |                                  | 48Vin                                  |      |      | 100  |                 |
| Operating Ambient Temperature | With de-rating, above 61°C       | Vo=3.3V<br>Vo=5V                       | -40  |      | 85   | °C              |
|                               | With de-rating, above 65°C       | Vo=12V<br>Vo=15V<br>Vo=±12V<br>Vo=±15V |      |      |      |                 |
| Operating Case Temperature    | At the center part of case plate | All                                    | -40  |      | 105  | °C              |
| Storage Temperature           |                                  | All                                    | -55  |      | 125  | °C              |

### INPUT CHARACTERISTICS

| PARAMETER                         | NOTES and CONDITIONS                            | Device                 | Min. | Typ. | Max. | Units            |
|-----------------------------------|---|------------------------|------|------|------|------------------|
| Operating Input Voltage           |   | 24Vin                  | 9    | 24   | 36   | V <sub>dc</sub>  |
|                                   |   | 48Vin                  | 18   | 48   | 74   |                  |
| Input Under Voltage Lockout       |   |                        |      |      |      |                  |
| Turn-On Voltage Threshold         | 100% Load                                       | 24Vin                  | 8    | 8.5  | 8.8  | V <sub>dc</sub>  |
|                                   |   | 48Vin                  | 16.5 | 17   | 17.5 |                  |
| Turn-Off Voltage Threshold        | 100% Load                                       | 24Vin                  | 7    | 7.6  | 8.3  | V <sub>dc</sub>  |
|                                   |   | 48Vin                  | 15   | 15.8 | 16.5 |                  |
| Lockout Hysteresis Voltage        | 100% Load                                       | 24Vin                  |      | 0.5  |      | V <sub>dc</sub>  |
|                                   |   | 48Vin                  |      | 1    |      |                  |
| Maximum Input Current             | V <sub>in</sub> =9V, Full load                  | 24Vin                  |      | 1.4  |      | A                |
|                                   | V <sub>in</sub> =18V, Full load                 | 48Vin                  |      | 0.7  |      |                  |
| No-Load Input Current             | V <sub>in</sub> =24, 48V, I <sub>o</sub> =0A    | See Model Number Table |      |      |      | mA               |
| Input Filter                      | Pi Type   | All                    |      |      |      |                  |
| Inrush Current (I <sup>2</sup> t) | As per ETS300 132-2.                            | All                    |      |      | 0.1  | A <sup>2</sup> s |
| Input Reflected Ripple Current    | V <sub>in</sub> =Nominal, L=1uH, load=full load | All                    |      | 30   |      | mA               |

### OUTPUT CHARACTERISTICS

| PARAMETER  | NOTES and CONDITIONS                                      | Device                 | Min. | Typ. | Max.  | Units |
|--|---|------------------------|------|------|-------|-------|
| Voltage Set Point Accuracy                               | V <sub>in</sub> =24, 48V, Full load, T <sub>c</sub> =25°C | All                    | -1.0 |      | +1.0  | %     |
| Output Voltage Balance                                   | V <sub>in</sub> =24, 48V, Full load, T <sub>c</sub> =25°C | Dual                   | -1.0 |      | +1.0  | %     |
| Output Voltage Regulation                                |   |                        |      |      |       |       |
| Load Regulation  | Full load to no load                                      | All                    |      |      | ±1.0  | %     |
| Line Regulation  | V <sub>in</sub> =High line to low line, full load         | Single                 |      |      | ±0.2  | %     |
|  |   | Dual                   |      |      | ±0.5  |       |
| Temperature Coefficient                                  | T <sub>c</sub> =-40°C to 85°C                             | All                    |      |      | ±0.02 | %/°C  |
| Output Voltage Ripple and Noise (5Hz to 20MHz Bandwidth) |   |                        |      |      |       |       |
| Peak-to-Peak   | Full load, 1uF ceramic capacitors                         | 3.3Vo                  |      |      | 100   | mV    |
|  |   | 5Vo                    |      |      | 100   |       |
|  |   | 12Vo                   |      |      | 120   |       |
|  |   | 15Vo                   |      |      | 150   |       |
| Output Current Range                                     | V <sub>in</sub> = 9 to 36V, 18 to 74V                     | See Model Number Table |      |      |       | A     |



# EC5DAW Series

| PARAMETER                 | NOTES and CONDITIONS       | Device                 | Min.                       | Typ. | Max. | Units |
|---------------------------|----------------------------|------------------------|----------------------------|------|------|-------|
| Over Current Protection   | Hiccup mode. Auto recovery | All                    |                            | 170  |      | %     |
| Short Circuit Protection  |                            | All                    | Continuous, Auto Recovery. |      |      |       |
| External Load Capacitance | Full load (resistive)      | See Model Number Table |                            |      |      | uF    |

## EFFICIENCY

| PARAMETER | NOTES and CONDITIONS                   | Device         | Min.                   | Typ. | Max. | Units |
|-----------|--|----------------|------------------------|------|------|-------|
| 100% Load | $V_{in}=12V, 24V$<br>$V_{in}=24V, 48V$ | 24Vin<br>48Vin | See Model Number Table |      |      | %     |

## DYNAMIC CHARACTERISTICS

| PARAMETER                               | NOTES and CONDITIONS   | Device | Min. | Typ. | Max. | Units |
|---|--|--------|------|------|------|-------|
| Output Voltage Current Transient        |  |        |      |      |      |       |
| Error Band                              | 75% to 100% of $I_{o\_max}$ step load change<br>$dI/dt=0.1A/us$<br>(within 1% $V_{out}$ nominal) | All    |      |      | ±5   | %     |
| Recovery Time                           |  | All    |      |      | 250  | us    |
| Turn-On Delay and Rise Time             |  |        |      |      |      |       |
| Full load (Constant resistive load)     |  |        |      |      |      |       |
| Turn-On Delay Time, From On/Off Control | $V_{on/off}$ to 10% $V_{o\_set}$ , Remote On   | All    |      | 15   |      | ms    |
| Turn-On Delay Time, From Input          | $V_{in\_min}$ to 10% $V_{o\_set}$ , Power Up   | All    |      | 15   |      | ms    |
| Output Voltage Rise Time                | 10% $V_{o\_set}$ to 90% $V_{o\_set}$   | All    |      | 8    |      | ms    |

## ISOLATION CHARACTERISTICS

| PARAMETER  | NOTES and CONDITIONS      | Device | Min. | Typ. | Max.         | Units                |
|--|---------------------------|--------|------|------|--------------|----------------------|
| Isolation Voltage<br>(100% factory Hi-Pot tested @2sec.) | 1 Minute; input to output | All    |      |      | 3000<br>2000 | $V_{dc}$<br>$V_{ac}$ |
| Isolation Resistance                                     | Input to output           | All    | 1000 |      |              | MΩ                   |
| Isolation Capacitance                                    | Input to output           | All    |      | 50   |              | pF                   |

## FEATURE CHARACTERISTICS

| PARAMETER   | NOTES and CONDITIONS               | Device | Min. | Typ. | Max. | Units |
|---|------------------------------------|--------|------|------|------|-------|
| Switching Frequency   | Pulse wide modulation (PWM), Fixed | All    |      | 530  |      | KHz   |
| On/Off Control, Negative Remote On/Off logic, Refer to -Vin Pin |                                    |        |      |      |      |       |
| Logic High (Module Off)   | $V_{on/off}$ at $I_{on/off}$       | All    | 2    |      | 4    | mA    |
| Logic Low (Module On)   | Pin open=On, high impedance        | All    |      |      |      |       |
| Off Converter Input Current                                     | Shutdown input idle current        | All    |      |      | 2.5  | mA    |

## GENERAL SPECIFICATIONS

| PARAMETER           | NOTES and CONDITIONS  | Device | Min. | Typ. | Max. | Units      |
|---------------------|---|--------|------|------|------|------------|
| MTBF                | $I_o=100\%$ of $I_{o\_max}$ ;<br>MIL-HDBK - 217F_Notice 1, GB, 25°C | 24S33  |      | 2042 |      | K<br>hours |
|                     |   | 24S05  |      | 1941 |      |            |
|                     |   | 24S12  |      | 1881 |      |            |
|                     |   | 24S15  |      | 1964 |      |            |
|                     |   | 24D12  |      | 1722 |      |            |
|                     |   | 24D15  |      | 1876 |      |            |
|                     |   | 48S33  |      | 2040 |      |            |
|                     |   | 48S05  |      | 1945 |      |            |
|                     |   | 48S12  |      | 1903 |      |            |
|                     |   | 48S15  |      | 1968 |      |            |
|                     |   | 48D12  |      | 1742 |      |            |
|                     |   | 48D15  |      | 1889 |      |            |
| Weight              |   | All    |      | 6.6  |      | grams      |
| Case Material       | Plastic, DAP, UL 94V-0  |        |      |      |      |            |
| Base plate Material | Non-Conductive Base   |        |      |      |      |            |



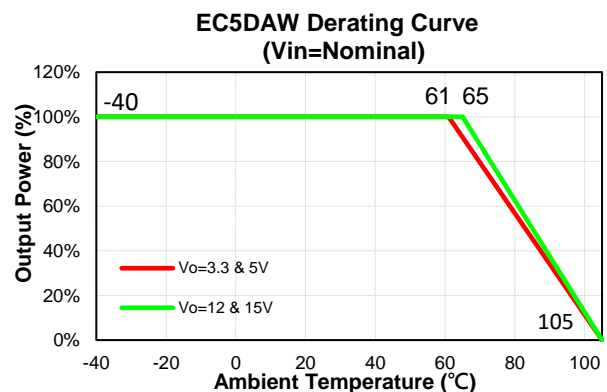
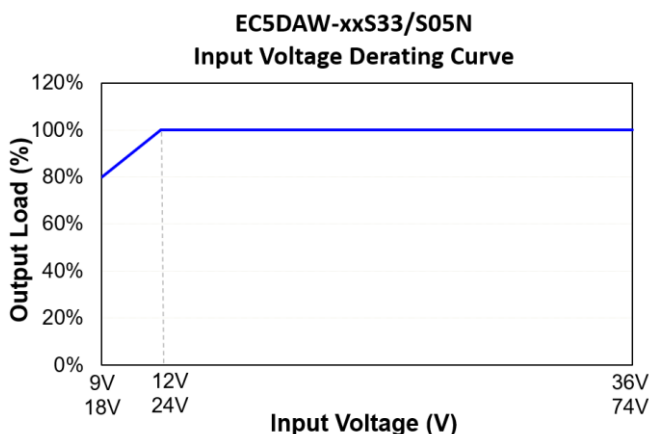
# EC5DAW Series

## GENERAL SPECIFICATIONS

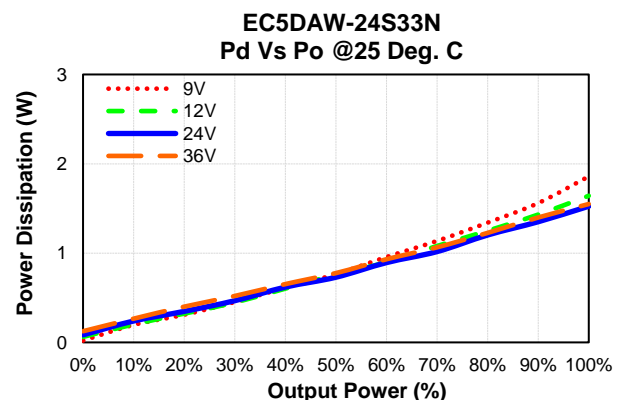
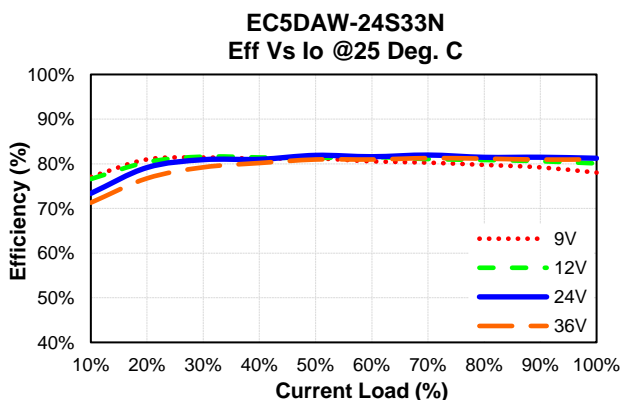
|                            |   |                  |
|----------------------------|---|------------------|
| Potting Material           | UL 94V-0  |                  |
| Pin Material               | Base: Copper with Steel<br>Plating: Barrel Tin  |                  |
| Shock/Vibration            | MIL-STD-810F Compliant  |                  |
| Humidity                   | 95% RH max. Non Condensing  |                  |
| Altitude                   | 2000m Operating Altitude  |                  |
| Thermal Shock              | MIL-STD-810F  |                  |
| EMI                        | Meets EN55032 (with external filter)  | Class A          |
| ESD                        | Meets EN61000-4-2 Level 2: Air $\pm 8kV$ , Contact $\pm 4kV$  | Perf. Criteria A |
| Radiated immunity          | Meets EN61000-4-3 Level 2: 80~1000MHz, 3V/m   | Perf. Criteria A |
| Fast Transient             | Meets EN61000-4-4 Level 2: On power input port, $\pm 0.5kV$ , external input TVS required                     | Perf. Criteria A |
| Surge                      | Meets EN61000-4-5 Level 2: Line to earth, $\pm 1kV$ , Line to line, $\pm 0.5kV$ , external input TVS required | Perf. Criteria A |
| Conducted immunity         | Meets EN61000-4-6 Level 2: 0.15~80MHz, 3V   | Perf. Criteria A |
| Application Note Link      | <a href="#">EC5DAW Series App Notes</a>   |                  |
| Packaging Information Link | <a href="#">Packaging Information</a>   |                  |

## CHARACTERISTIC CURVE

### Power Derating Curve



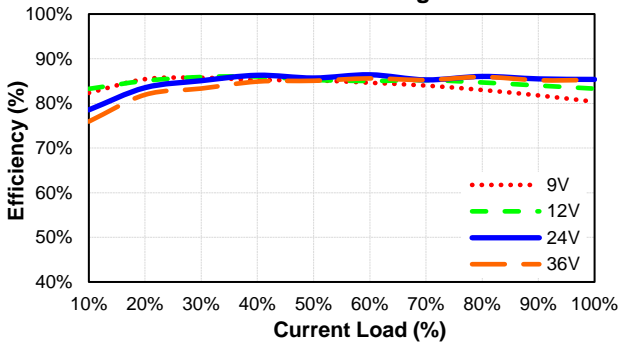
### Performance Data



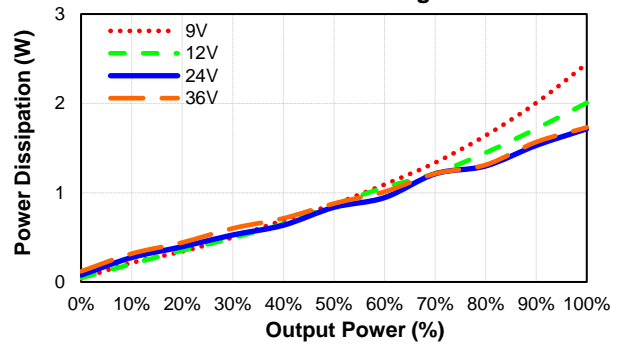


# EC5DAW Series

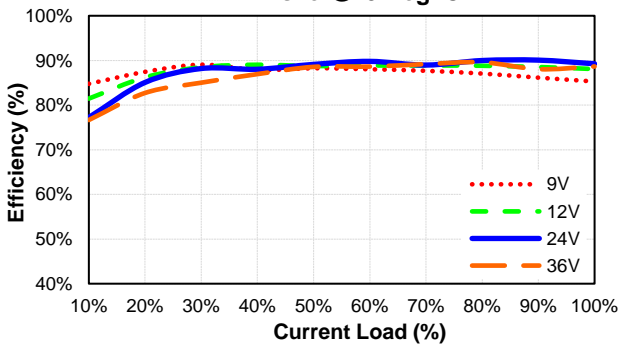
**EC5DAW-24S05N**  
Eff Vs Io @25 Deg. C



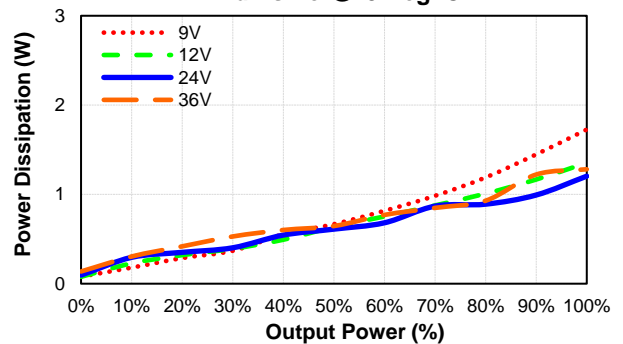
**EC5DAW-24S05N**  
Pd Vs Po @25 Deg. C



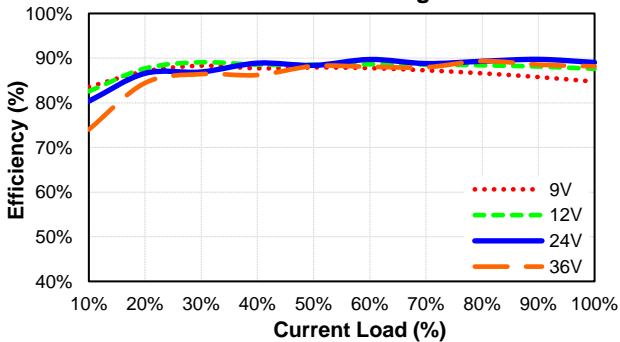
**EC5DAW-24S12N**  
Eff Vs Io @25 Deg. C



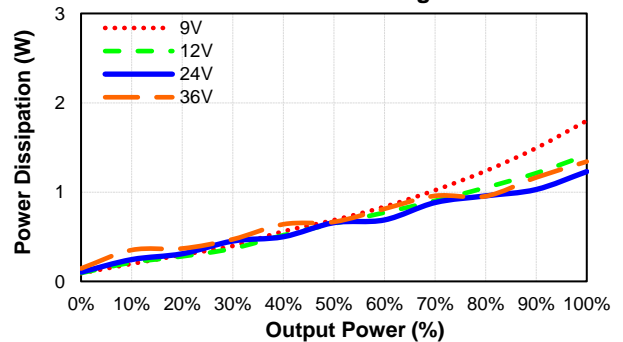
**EC5DAW-24S12N**  
Pd Vs Po @25 Deg. C



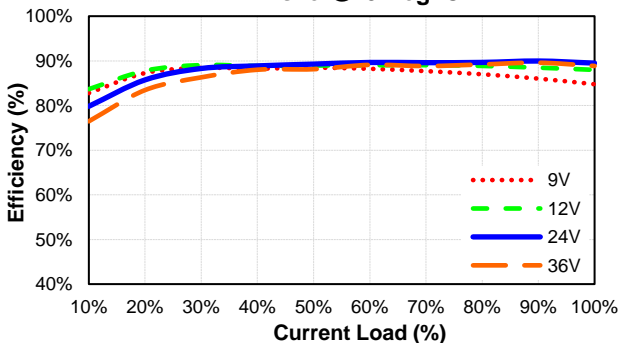
**EC5DAW-24S15N**  
Eff Vs Io @25 Deg. C



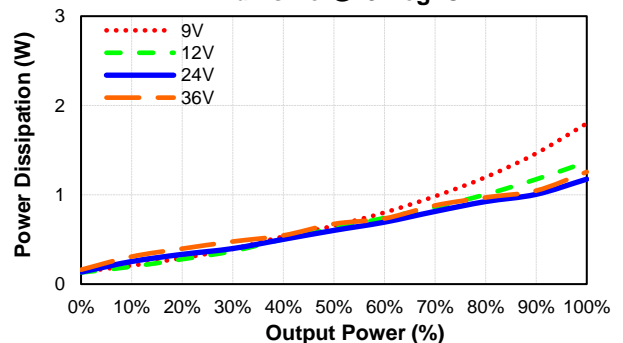
**EC5DAW-24S15N**  
Pd Vs Po @25 Deg. C



**EC5DAW-24D12N**  
Eff Vs Io @25 Deg. C



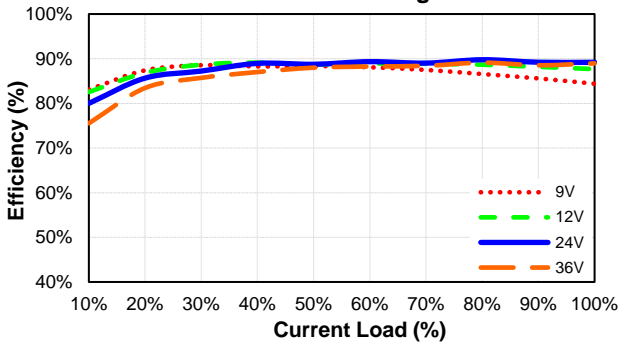
**EC5DAW-24D12N**  
Pd Vs Po @25 Deg. C



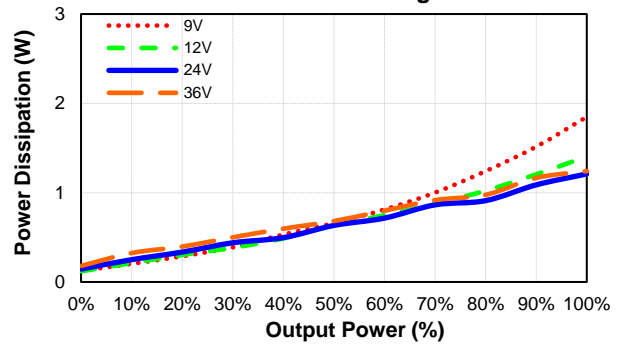


# EC5DAW Series

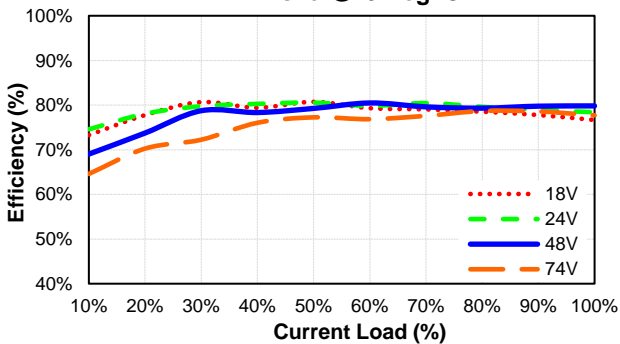
**EC5DAW-24D15N**  
Eff Vs Io @25 Deg. C



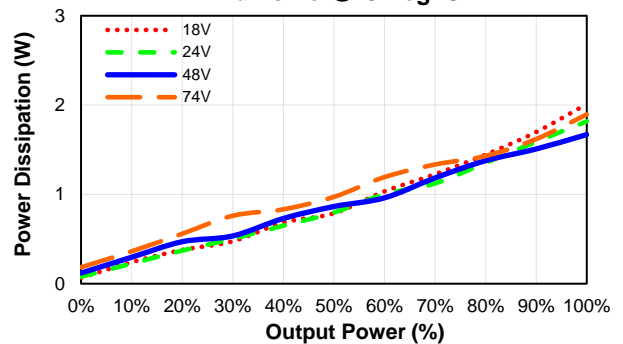
**EC5DAW-24D15N**  
Pd Vs Po @25 Deg. C



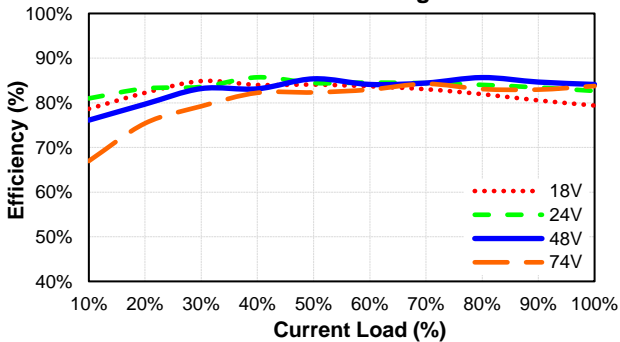
**EC5DAW-48S33N**  
Eff Vs Io @25 Deg. C



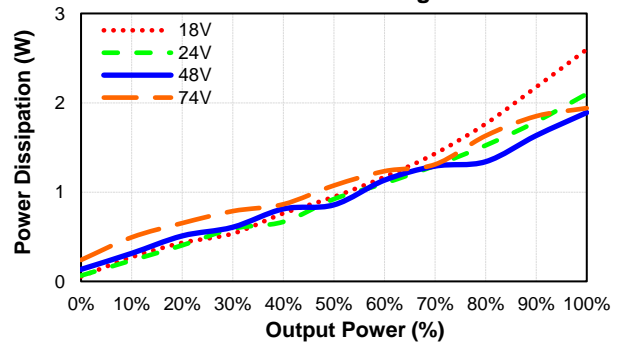
**EC5DAW-48S33N**  
Pd Vs Po @25 Deg. C



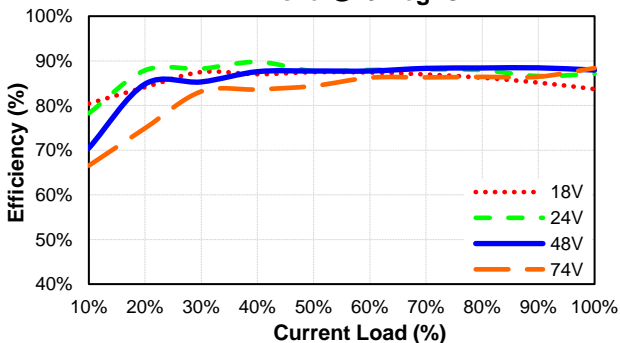
**EC5DAW-48S05N**  
Eff Vs Io @25 Deg. C



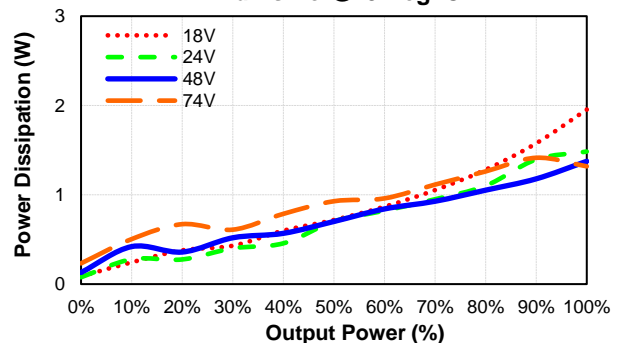
**EC5DAW-48S05N**  
Pd Vs Po @25 Deg. C



**EC5DAW-48S12N**  
Eff Vs Io @25 Deg. C



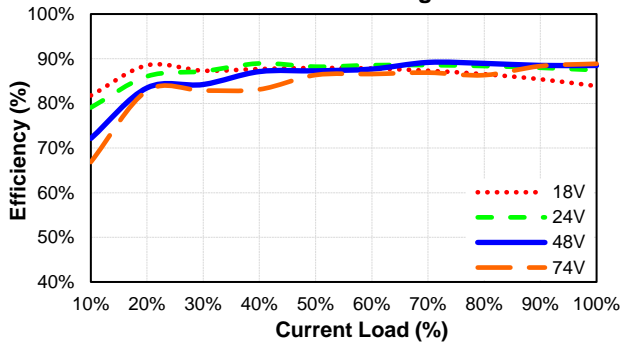
**EC5DAW-48S12N**  
Pd Vs Po @25 Deg. C



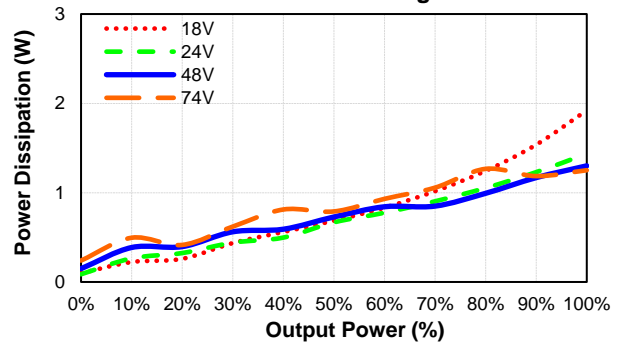


# EC5DAW Series

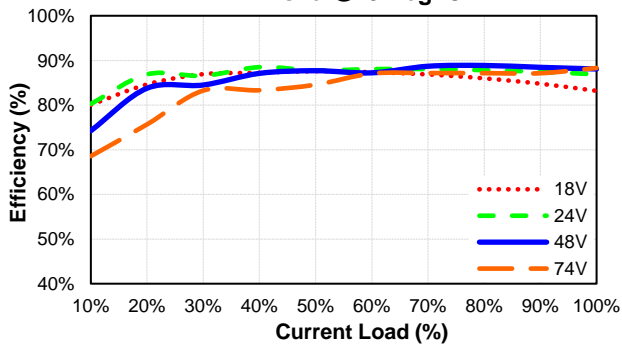
**EC5DAW-48S15N**  
Eff Vs Io @25 Deg. C



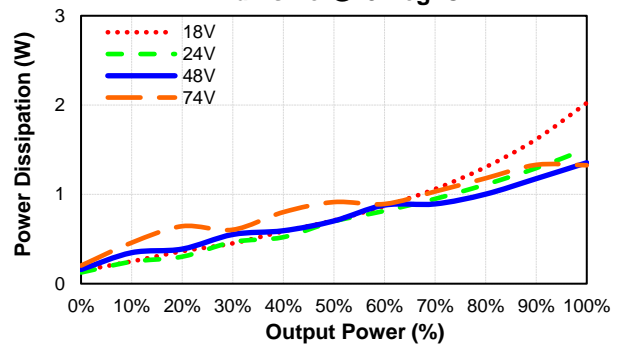
**EC5DAW-48S15N**  
Pd Vs Po @25 Deg. C



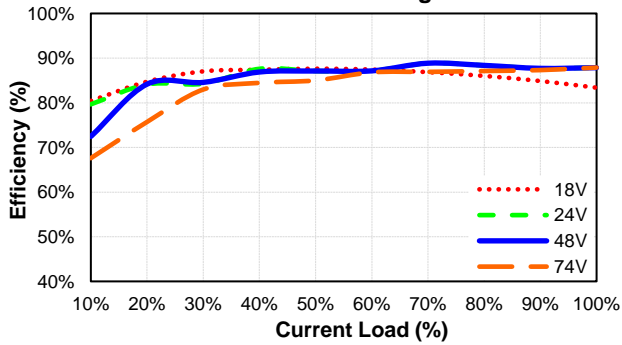
**EC5DAW-48D12N**  
Eff Vs Io @25 Deg. C



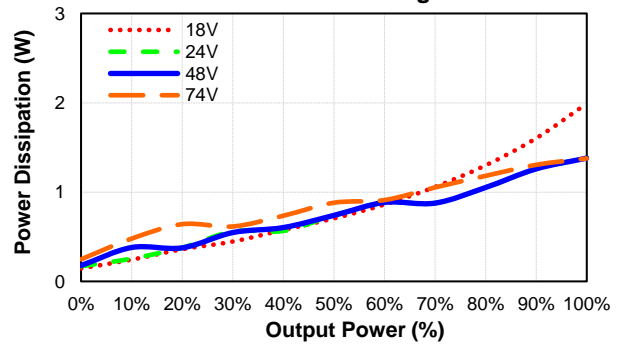
**EC5DAW-48D12N**  
Pd Vs Po @25 Deg. C



**EC5DAW-48D15N**  
Eff Vs Io @25 Deg. C



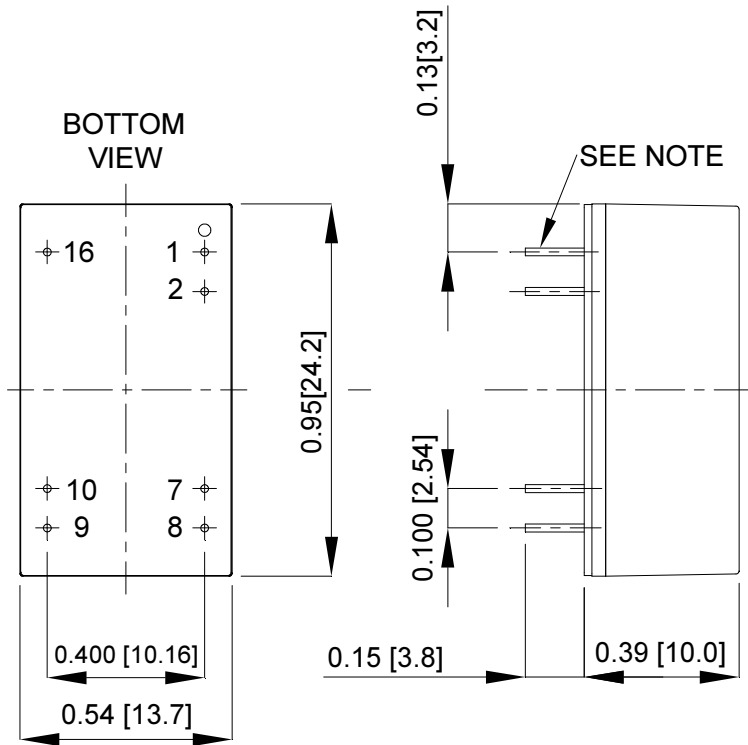
**EC5DAW-48D15N**  
Pd Vs Po @25 Deg. C





# EC5DAW Series

## MECHANICAL SPECIFICATION



NOTE : Pin Size is 0.02±0.002 Inch(0.5±0.05 mm)DIA  
All Dimensions in Inches(mm)

Tolerance Inches : X.XX=±0.02, X.XXX=±0.010

Millimeters : X.X=±0.5, X.XX=±0.25

| PIN CONNECTION |               |             |
|----------------|---------------|-------------|
| PIN            | Single Output | Dual Output |
| 1              | -V Input      | -V Input    |
| 2              | Remote        | Remote      |
| 7              | NC            | NC          |
| 8              | NC            | Common      |
| 9              | +V Output     | +V Output   |
| 10             | -V Output     | -V Output   |
| 16             | +V Input      | +V Input    |

\* NC-NO CONNECTION WITH PIN

CINCON Electronics Co. Ltd.  
Add: 14F, No. 306, Sec.4, Hsin Yi Rd., Taipei, Taiwan  
Tel: 886-2-27086210  
Fax: 886-2-27029852  
E-mail: [sales@cincon.com.tw](mailto:sales@cincon.com.tw)  
Web: [www.cincon.com](http://www.cincon.com)



## X-ON Electronics

Largest Supplier of Electrical and Electronic Components

*Click to view similar products for [Isolated DC/DC Converters - Through Hole](#) category:*

*Click to view products by [Cincon](#) manufacturer:*

Other Similar products are found below :

[RSK-2405SRUW/H3](#) [CCG3-48-12SF](#) [CCG6-12-05SF](#) [RSOK-2405SZ/H3](#) [CQB100W14-72S15](#) [TRI 1-2413](#) [CCG6-24-15DF](#) [TRI 1-1211SM](#)  
[CCG6-24-12DF](#) [RYK-053.3S/H](#) [MGJ2D241802BSC](#) [MGJ2D122003BSC](#) [EC4BE13](#) [PXD40-24WD15](#) [CCG1R5-12-03SF](#)  
[MGJ2D242005BSC](#) [TRI 1-2412SM](#) [TRI 1-1212](#) [MGJ1D241802SC](#) [EC5DAW-48S12N](#) [RP06-11005SRAW](#) [TRI 1-1213](#) [TRI 1-1211](#) [R2M-](#)  
[2412D](#) [PXD40-24WD12](#) [MGJ1D120603SC](#) [CCG10-24-15DF](#) [MGJ2D241505BSC](#) [EC5DAW-24D15N](#) [TRI 1-1212SM](#) [CCG1R5-24-05SF](#)  
[CCG10-48-03SF](#) [PXD60-48WD24](#) [CQB100W14-72S15N](#) [MGJ1D121505SC](#) [CCG6-24-03SF](#) [RP10-11012SRAW](#) [MGJ1D122005SC](#)  
[MGJ2D151802BSC](#) [RP03-11012SRAW](#) [EC5DAW-24S15N](#) [RPA40-11024SFR](#) [PXD40-48WS3P3](#) [PXD40-24WS12](#) [NMR1S0505SC](#)  
[CCG1R5-48-03SF](#) [EC5DAW-24D12N](#) [CCG3-48-05SF](#) [CCG6-48-12SF](#) [CCG10-24-15SF](#)