E-Star Power Development Co., Ltd. (E-STAR)
1F., No.40, Juren Ln., Sec. 2, Sanmin Rd., Banciao Dist., New Taipei City 22069, Taiwan (R.O.C.)
Phone : 886-2-2957 5580 Fax : 886-2-2957 7473

# 10W Module DC to Dc power supply > EC7AW

## Features

- Efficiency up to 89%
- Fixed Switching Frequency
- Regulated Outputs
- Remote On/Off
- Low No Load Power Consumption
- Fully Protected (OCP/OVP/UVLO)
- 3000Vdc I/O Isolation
- No Tantalum Capacitor Inside
- DIP-24 Metal Package
- Meets Industrial Standard 1.25"x0.80"x0.40"
- Safety Meets IEC/EN/UL 62368-1
- EMI Meets EN55032 Class A
  Without External Component


| MODEL NUMBER | INPUT VOLTAGE | OUTPUT VOLTAGE | OUTPUT CURRENT | | INPUT CURRENT | | % EFF. | | CAPACITOR LOAD MAX. |
|---|---|---|---|---|---|---|---|---|---|
| | | | MIN. | MAX. | NO LOAD | FULL LOAD | (1) | (2) | |
| EC7AW-24S33 | 9-36 VDC | 3.3 VDC | 0 mA | 2000 mA | 6 mA | 340 mA | 81 | 81.5 | 2000uF |
| EC7AW-24S05 | 9-36 VDC | 5 VDC | 0 mA | 2000 mA | 6 mA | 487 mA | 85.5 | 86 | 2000uF |
| EC7AW-24S12 | 9-36 VDC | 12 VDC | 0 mA | 833 mA | 6 mA | 471 mA | 88.5 | 89 | 833uF |
| EC7AW-24S15 | 9-36 VDC | 15 VDC | 0 mA | 666 mA | 7 mA | 468 mA | 89 | 89.5 | 666μF |
| EC7AW-24D12 | 9-36 VDC | ±12 VDC | 0 mA | ±417 mA | 8 mA | 474 mA | 88 | 88.5 | 417μF |
| EC7AW-24D15 | 9-36 VDC | ±15 VDC | 0 mA | ±333 mA | 10 mA | 473 mA | 88 | 89 | 333uF |
| EC7AW-48S33 | 18-74 VDC | 3.3 VDC | 0 mA | 2000 mA | 6 mA | 171 mA | 80.5 | 81.5 | 2000uF |
| EC7AW-48S05 | 18-74 VDC | 5 VDC | 0 mA | 2000 mA | 6 mA | 244 mA | 85.5 | 86 | 2000uF |
| EC7AW-48S12 | 18-74 VDC | 12 VDC | 0 mA | 833 mA | 6 mA | 235 mA | 88.5 | 90 | 833uF |
| EC7AW-48S15 | 18-74 VDC | 15 VDC | 0 mA | 666 mA | 6 mA | 234 mA | 89 | 89.5 | 666μF |
| EC7AW-48D12 | 18-74 VDC | ±12 VDC | 0 mA | ±417 mA | 6 mA | 237 mA | 88 | 89.5 | 417μF |
| EC7AW-48D15 | 18-74 VDC | ±15 VDC | 0 mA | ±333 mA | 7 mA | 237 mA | 88 | 89.5 | 333uF |

NOTE:

1. Nominal Input Voltage 24 or 48 VDC
2. Measured at 12VDC for 24Vin, 24VDC for 48Vin

## PART NUMBER

| Series | Nominal Input Voltage | Number of Outputs | Nominal Output Voltage | Remote On/Off Logic |
|---|---|---|---|---|
| EC7AW- | II | O | XX | L |
| EC7AW | 24: 24VDC<br>48: 48VDC | S: Single<br>D: Dual | 33: 3.3VDC<br>05: 5.0VDC<br>12: 12VDC<br>15: 15VDC | None: Positive<br>N: Negative |

Part Number Example:

**EC7AW-24S12N:** 1.25"x0.8",10W, 4:1 9-36Vdc Input, Single 12Vdc Output, Negative Logic

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# TECHNICAL SPECIFICATIONS

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

## ABSOLUTE MAXIMUM RATINGS

| PARAMETER | NOTES and CONDITIONS | Device | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| Input Voltage | Continuous | 24Vin<br>48Vin | -0.3<br>-0.3 | | 36<br>74 | $V_{dc}$ |
| Input Surge Voltage | 100ms max. | 24Vin<br>48Vin | | | 50<br>100 | $V_{dc}$ |
| Operating Ambient Temperature | With de-rating, above 71℃ | Vo=3.3V<br>Vo=5V | -40 | | 85 | ℃ |
| | With de-rating, above 75℃ | Vo=12V<br>Vo=15V<br>Vo=±12V<br>Vo=±15V | | | | |
| Operating Case Temperature | At the Center Part of Case Plate | All | -40 | | 105 | ℃ |
| Storage Temperature | | All | -55 | | 125 | ℃ |

## INPUT CHARACTERISTICS

| PARAMETER | NOTES and CONDITIONS | Device | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| Operating Input Voltage | | 24Vin<br>48Vin | 9<br>18 | 24<br>48 | 36<br>74 | $V_{dc}$ |
| Input Under Voltage Lockout | | | | | | |
| Turn-On Voltage Threshold | 100% Load | 24Vin<br>48Vin | 8<br>16.5 | 8.5<br>17 | 8.8<br>17.5 | $V_{dc}$ |
| Turn-Off Voltage Threshold | 100% Load | 24Vin<br>48Vin | 7.5<br>15.5 | 8<br>16 | 8.3<br>16.5 | $V_{dc}$ |
| Lockout Hysteresis Voltage | 100% Load | 24Vin<br>48Vin | | 0.5<br>1 | | $V_{dc}$ |
| Maximum Input Current | $V_{in}$=9V, Full Load | 24Vin | | 1.4 | | A |
| | $V_{in}$=18V, Full Load | 48Vin | | 0.7 | | |
| No-Load Input Current | $V_{in}$=Nominal, Io=0A | See Model Number Table | | | | mA |
| Input Filter | Pi filter | All | | | | |
| Inrush Current ($I^2t$) | As per ETS300 132-2 | All | | | 0.1 | $A^2s$ |
| Input Reflected Ripple Current | P-P thru 12uH inductor, 5Hz to 20MHz | All | | 30 | | mA |

## OUTPUT CHARACTERISTICS

| PARAMETER | NOTES and CONDITIONS | Device | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| Voltage Set Point Accuracy | $V_{in}$=Nominal, Full Load, Tc=25℃ | All | -1.0 | | +1.0 | % |
| Output Voltage Balance | $V_{in}$=Nominal, Full Load, Tc=25℃ | Dual | -1.0 | | +1.0 | % |
| Output Voltage Regulation | | | | | | |
| Load Regulation | Full Load to No Load | All | | | ±1.0 | % |
| Line Regulation | $V_{in}$=High Line to Low Line, Full Load | All | | | ±0.2 | % |
| Temperature Coefficient | Tc=-40℃ to 85℃ | All | | | ±0.02 | %/℃ |
| Output Voltage Ripple and Noise (5Hz to 20MHz Bandwidth) | | | | | | |
| Peak-to-Peak | Full load, 1.0uF ceramic capacitors | 3.3Vo<br>5Vo<br>12Vo<br>15Vo | | | 100<br>100<br>120<br>150 | mV |
| Output Current Range | $V_{in}$=Nominal, | See Model Number Table | | | | A |
| Over Current Protection | Hiccup Mode. Auto Recovery | All | 110 | 140 | 170 | % |
| Short Circuit Protection | | All | Continuous, Auto Recovery | | | |
| External Load Capacitance | Full Load (Resistive) | See Model Number Table | | | | uF |

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| PARAMETER | NOTES and CONDITIONS | Device | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| Over Voltage Protection | Zener Clamp | 3.3Vo<br>5Vo<br>12Vo<br>15Vo<br>±12Vo<br>±15Vo | | 3.9<br>6.2<br>15<br>18<br>±15<br>±18 | | $V_{dc}$ |

## EFFICIENCY

| PARAMETER | NOTES and CONDITIONS | Device | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| 100% Load | $V_{in}$=Nominal, Full Load, Tc=25℃ | 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 $d_i/d_t$=0.1A/us (within 1% Vout 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 | | 5 | | ms |
| Turn-On Delay Time, From Input | $V_{in\_min}$ to 10%$V_{o\_set}$, Power Up | All | | 5 | | ms |
| Output Voltage Rise Time | 10%$V_{o\_set}$ to 90%$V_{o\_set}$ | 5Vo<br>Others | | 10<br>5 | | ms |

## ISOLATION CHARACTERISTICS

| PARAMETER | NOTES and CONDITIONS | Device | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| Isolation Voltage (100% factory Hi-Pot tested @2sec.) | 1 minute; Input to Output | All | | | 2000<br>3000 | $V_{ac}$<br>$V_{dc}$ |
| Isolation Resistance | Input to Output | All | 1000 | | | MΩ |
| Isolation Capacitance | Input to Output (10KHz, 0.25V) | All | | 1000 | | pF |

## FEATURE CHARACTERISTICS

| PARAMETER | NOTES and CONDITIONS | Device | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| Switching Frequency | Output Ripple Frequency | All | 477 | 530 | 583 | KHz |
| On/Off Control, Positive Remote On/Off logic, Refer to –Vin pin. | | | | | | |
| Logic Low (Module Off) | $V_{on/off}$ at $I_{on/off}$=1.0mA | All | 0 | | 1.2 | V |
| Logic High (Module On) | $V_{on/off}$ at $I_{on/off}$=0.0uA, Pin open=On | All | 3.5 or Open Circuit | | 74 | V |
| On/Off Control, Negative Remote On/Off logic, Refer to –Vin pin | | | | | | |
| Logic High (Module Off) | $V_{on/off}$ at $I_{on/off}$=0.0uA, Pin open=Off | All | 3.5 or Open Circuit | | 74 | V |
| Logic Low (Module On) | $V_{on/off}$ at $I_{on/off}$=1.0mA | All | 0 | | 1.2 | V |
| On/Off Current (for both remote on/off logic) | $I_{on/off}$ at $V_{on/off}$=0V | All | | 0.4 | 1 | mA |
| Leakage Current (for both remote on/off logic) | Logic High, $V_{on/off}$=15V | All | | | 30 | uA |
| Off Converter Input Current | Shutdown input idle current | All | | 3 | 5 | mA |

| PARAMETER | NOTES and CONDITIONS | Device | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|

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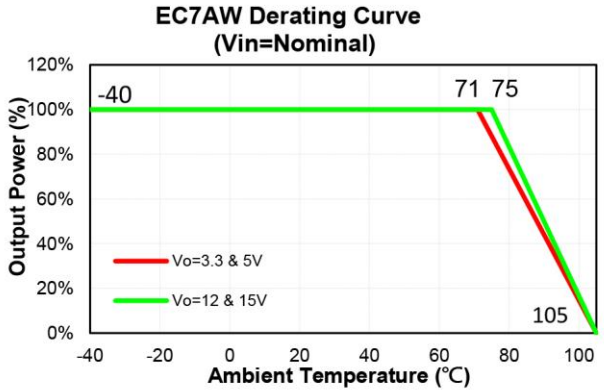
**10W Module DC to Dc power supply > EC7AW**

## 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℃ | 24S33 | | 1727 | | K hours |
| | | 24S05 | | 1520 | | |
| | | 24S12 | | 1634 | | |
| | | 24S15 | | 1711 | | |
| | | 24D12 | | 1466 | | |
| | | 24D15 | | 1579 | | |
| | | 48S33 | | 1725 | | |
| | | 48S05 | | 1605 | | |
| | | 48S12 | | 1583 | | |
| | | 48S15 | | 1715 | | |
| | | 48D12 | | 1453 | | |
| | | 48D15 | | 1585 | | |
| Weight | | All | | 18.4 | | grams |
| Case Material | Black Coated Copper | | | | | |
| Base plate Material | Non-Conductive Base | | | | | |
| 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 | | | | | |

## CHARACTERISTIC CURVE

### Power Derating Curve



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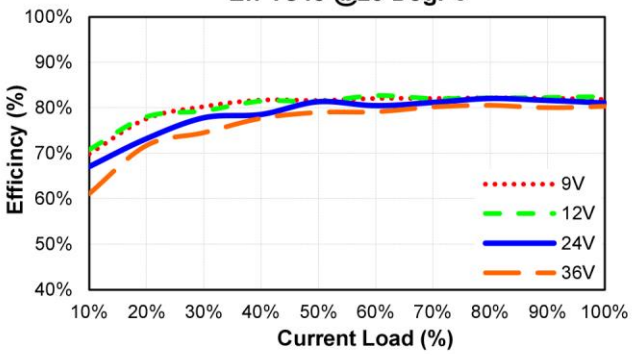
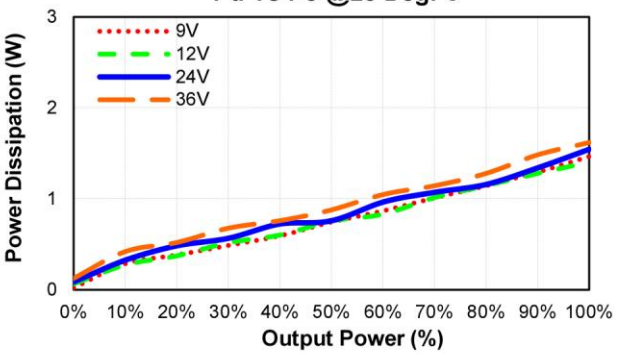
## 10W Module DC to Dc power supply > EC7AW

### erformance Data

EC7AW-24S33
Eff Vs Io @25 Deg. C




EC7AW-24S33
Pd Vs Po @25 Deg. C

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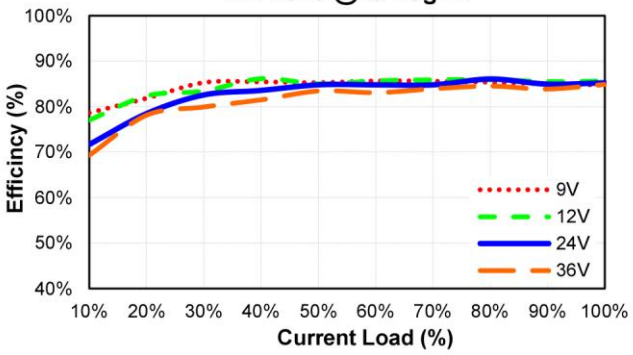


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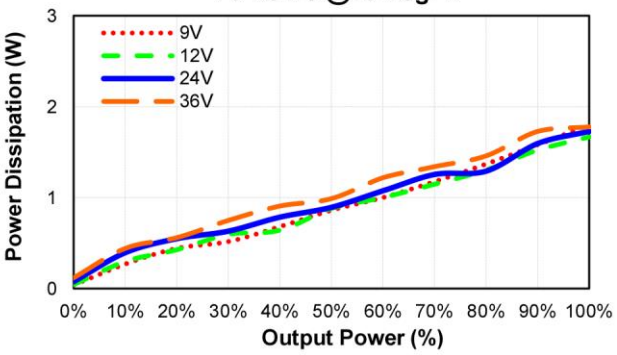


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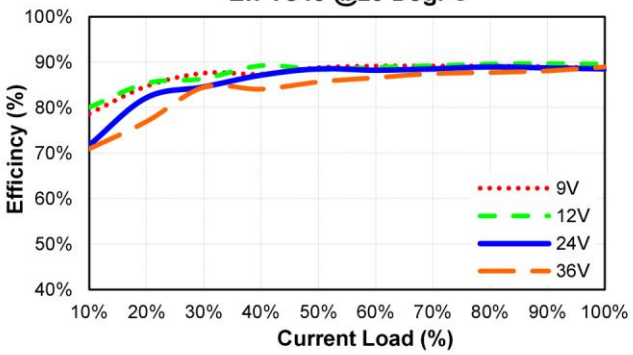


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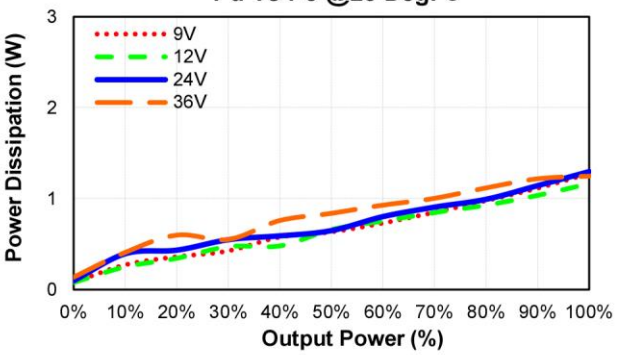


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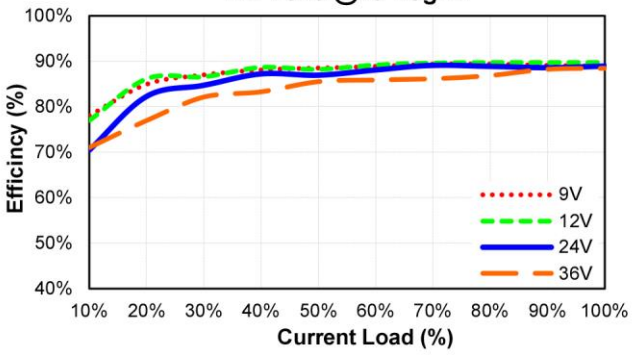


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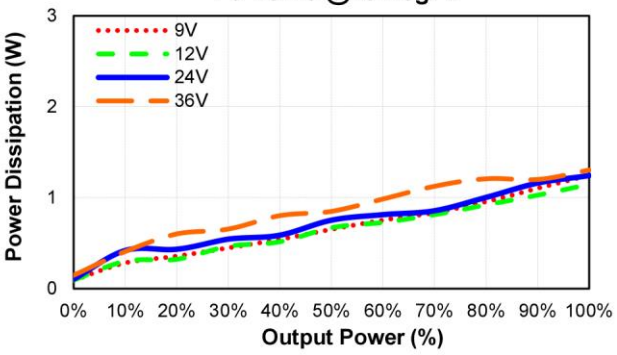

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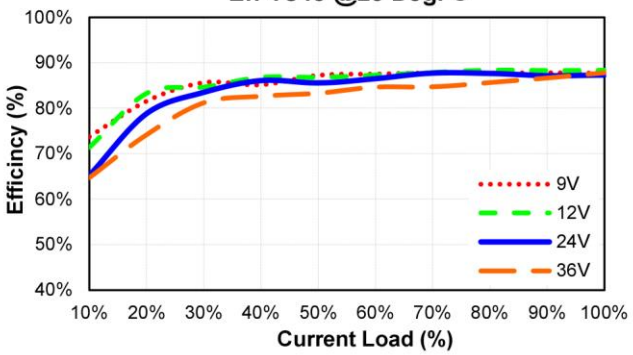


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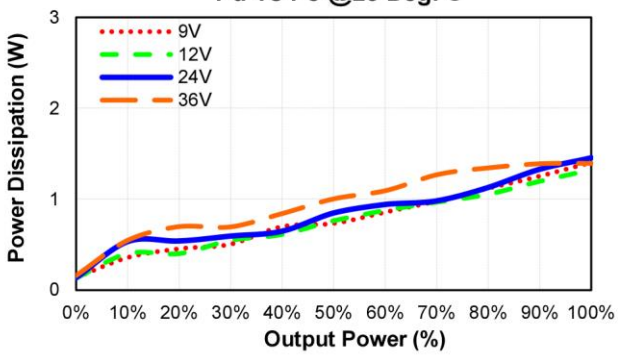


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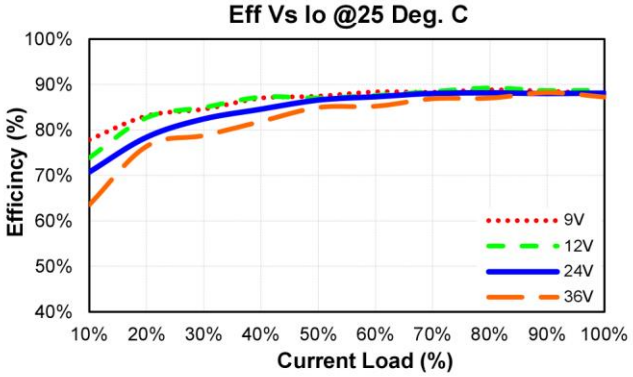


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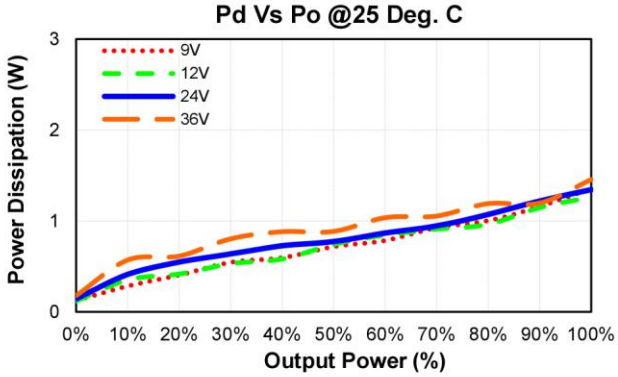


EC7AW-48S33
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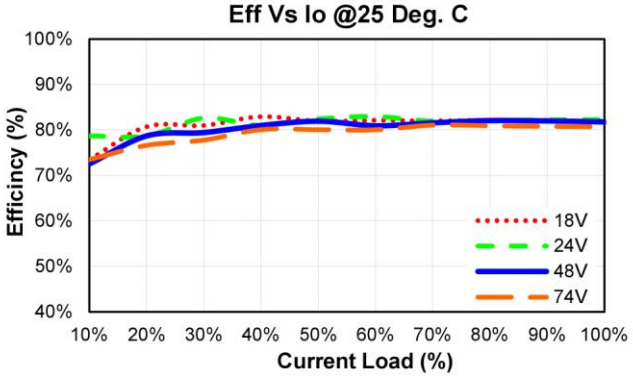


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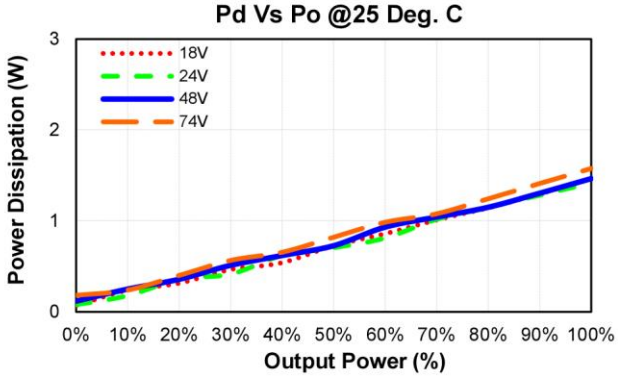


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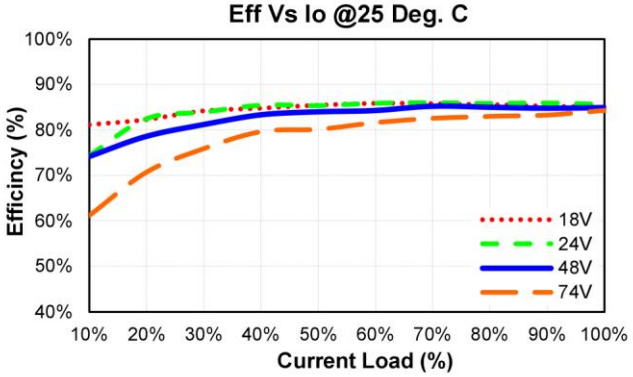


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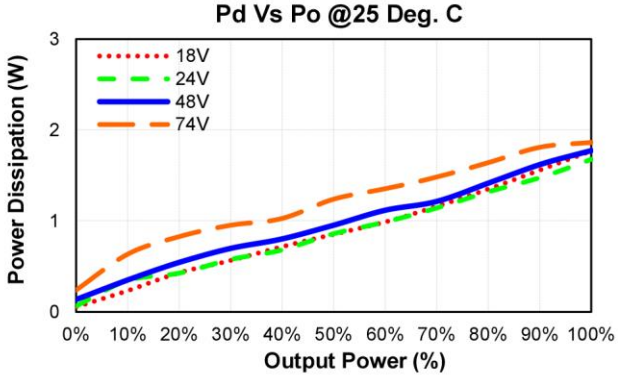

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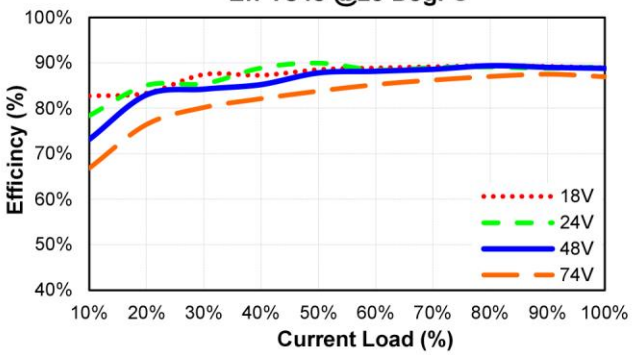


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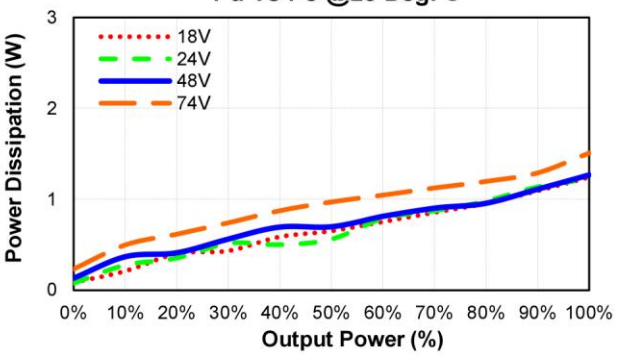


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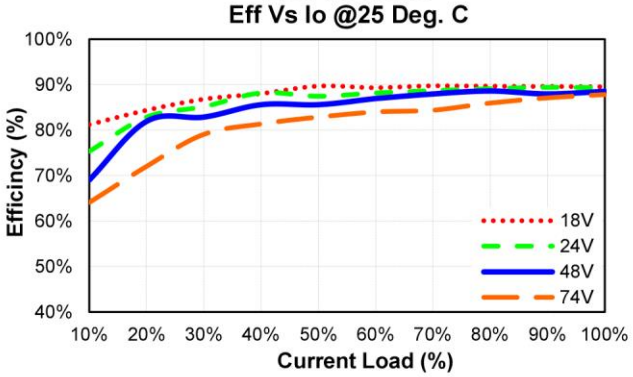
Eff Vs Io @25 Deg. C

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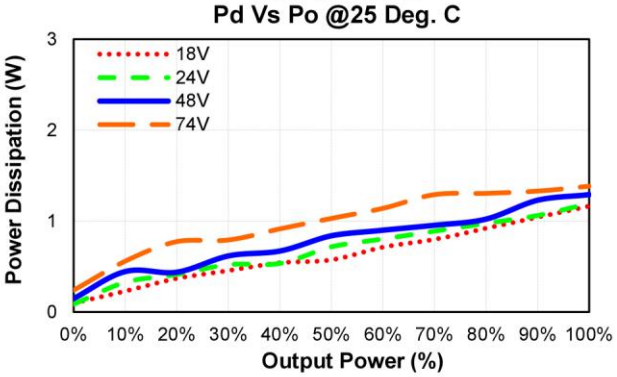
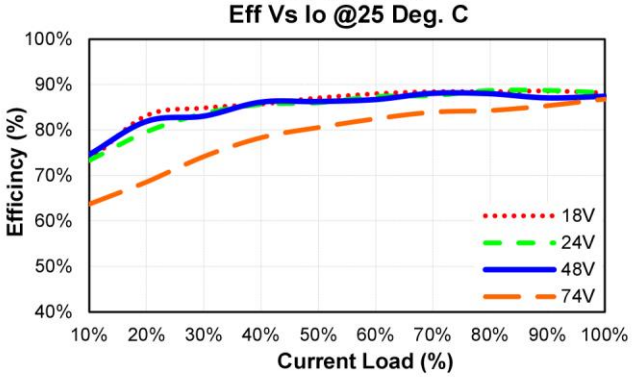



EC7AW-48D12
Eff Vs Io @25 Deg. C




EC7AW-48D12
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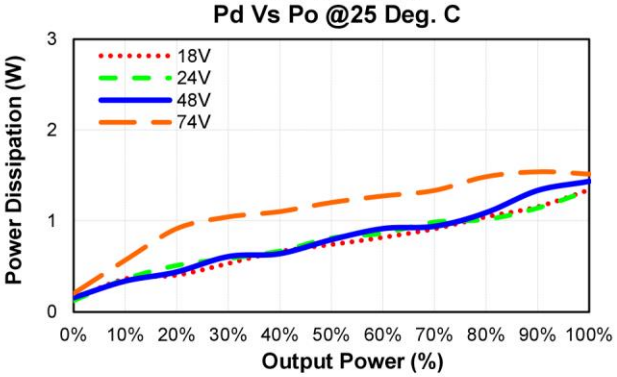


EC7AW-48D15
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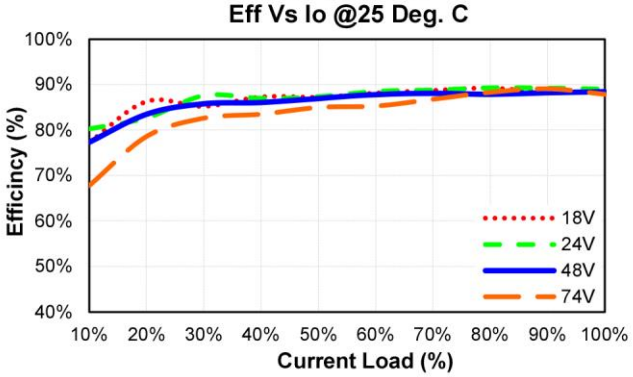
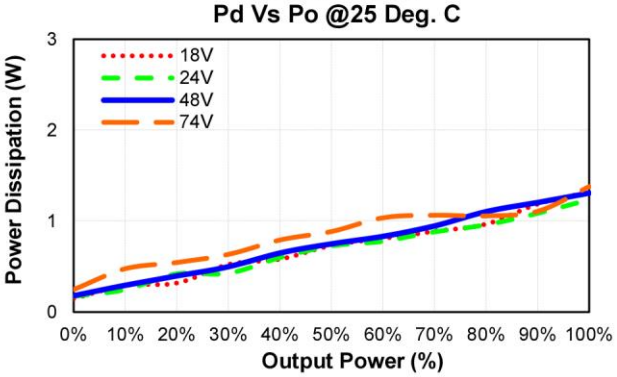



EC7AW-48D15
Pd Vs Po @25 Deg. C



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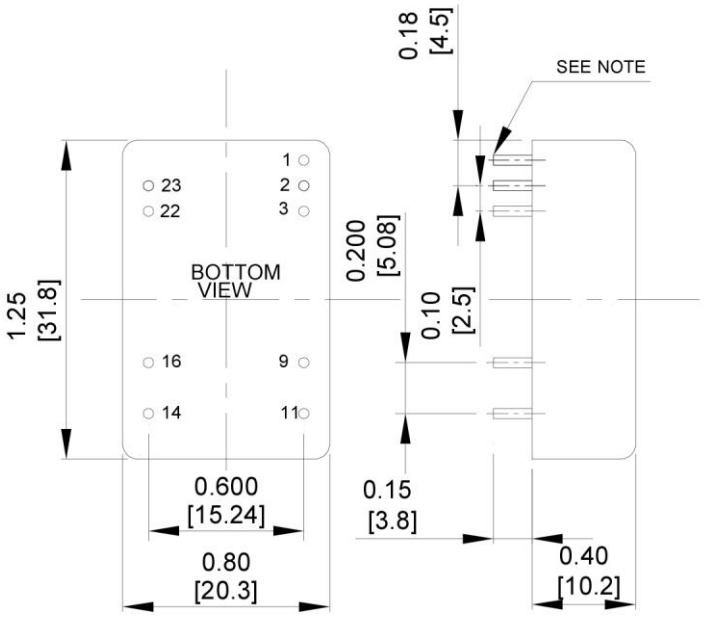
# 10W Module DC to Dc power supply > EC7AW

## MECHANICAL SPECIFICATION




NOTE:Pin Size is 0.02±0.002 Inch (0.5±0.05 mm)DIA
All Dimensions In Inches (mm)
Tolerances 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 | Remote on/off | Remote on/off |
| 2,3 | -V Input | -V Input |
| 9 | NP | Common |
| 11 | NC | -V Output |
| 14 | +V Output | +V Output |
| 16 | -V Output | Common |
| 22,23 | +V Input | +V Input |

* NC-NO CONNECTION WITH PIN
* NP-NO PIN