



# EC7AW SERIES 10 WATT 4:1 INPUT ISOLATED DC-DC CONVERTER

## 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	666uF
EC7AW-24D12	9-36 VDC	±12 VDC	0 mA	±417 mA	8 mA	474 mA	88	88.5	417uF
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	666uF
EC7AW-48D12	18-74 VDC	±12 VDC	0 mA	±417 mA	6 mA	237 mA	88	89.5	417uF
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	S: Single D: Dual	33: 3.3VDC	None: Positive N: Negative
	48: 48VDC		05: 5.0VDC	
			12: 12VDC 15: 15VDC	

**Part Number Example:**

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



## 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 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	7.5	8	8.3	V <sub>dc</sub>
		48Vin	15.5	16	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> =Nominal, I <sub>o</sub> =0A	See Model Number Table				mA
Input Filter	Pi filter	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	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 <sub>in</sub> =Nominal, Full Load, T <sub>c</sub> =25°C	All	-1.0		+1.0	%
Output Voltage Balance	V <sub>in</sub> =Nominal, 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	All			±0.2	%
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, 1.0uF ceramic capacitors	3.3V <sub>o</sub>			100	mV
		5V <sub>o</sub>			100	
		12V <sub>o</sub>			120	
		15V <sub>o</sub>			150	
Output Current Range	V <sub>in</sub> =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
Over Voltage Protection	Zener Clamp	3.3V <sub>o</sub>		3.9		V <sub>dc</sub>
		5V <sub>o</sub>		6.2		
		12V <sub>o</sub>		15		
		15V <sub>o</sub>		18		
		±12V <sub>o</sub>		±15		
		±15V <sub>o</sub>		±18		



# EC7AW Series

## EFFICIENCY

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
100% Load	$V_{in}$ =Nominal, Full Load, $T_c=25^{\circ}\text{C}$	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 $dI/dt=0.1\text{A}/\mu\text{s}$ (within 1% $V_{out}$ nominal)	All			$\pm 5$	%
Recovery Time		All			250	$\mu\text{s}$
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		10		ms
		Others		5		

## 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	$V_{ac}$
					3000	$V_{dc}$
Isolation Resistance	Input to Output	All	1000			M $\Omega$
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 $-V_{in}$ pin.						
Logic Low (Module Off)	$V_{on/off}$ at $I_{on/off}=1.0\text{mA}$	All	0		1.2	V
Logic High (Module On)	$V_{on/off}$ at $I_{on/off}=0.0\mu\text{A}$ , Pin open=On	All	3.5 or Open Circuit		74	V
On/Off Control, Negative Remote On/Off logic, Refer to $-V_{in}$ pin						
Logic High (Module Off)	$V_{on/off}$ at $I_{on/off}=0.0\mu\text{A}$ , Pin open=Off	All	3.5 or Open Circuit		74	V
Logic Low (Module On)	$V_{on/off}$ at $I_{on/off}=1.0\text{mA}$	All	0		1.2	V
On/Off Current (for both remote on/off logic)	$I_{on/off}$ at $V_{on/off}=0\text{V}$	All		0.4	1	mA
Leakage Current (for both remote on/off logic)	Logic High, $V_{on/off}=15\text{V}$	All			30	$\mu\text{A}$
Off Converter Input Current	Shutdown input idle current	All		3	5	mA

## GENERAL SPECIFICATIONS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
MTBF	$I_o=100\%$ of $I_{o\_max}$ ; MIL-HDBK - 217F_Notice 1, GB, $25^{\circ}\text{C}$	24S33		1727		K hours
		24S05		1520		
		24S12		1634		
		24S15		1711		
		24D12		1466		
		24D15		1579		

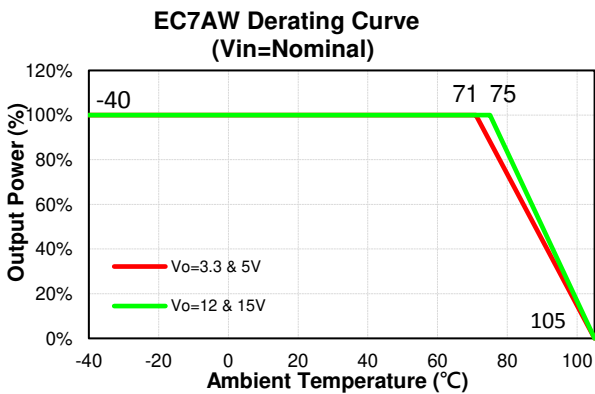


# EC7AW Series

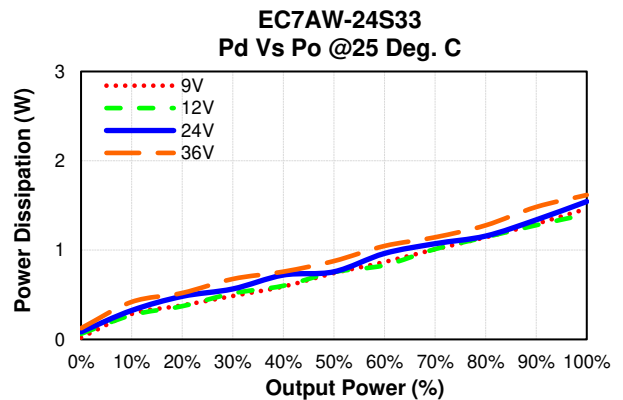
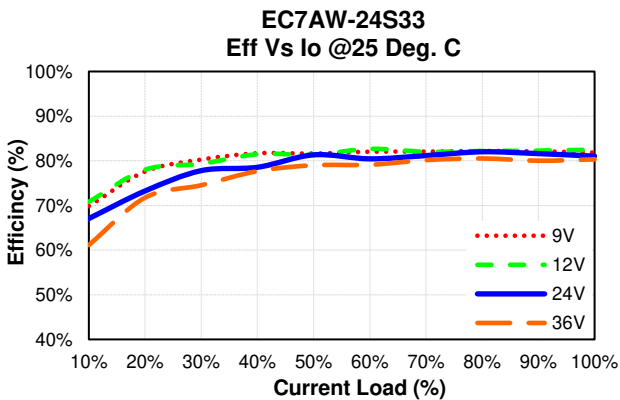
PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
MTBF	$I_o=100\%$ of $I_{o,max}$ ; MIL-HDBK - 217F_Notice 1, GB, 25°C	48S33		1725		K hours
		48S05		1605		
		48S12		1583		
		48S15		1715		
		48D12		1453		
		48D15		1585		
Weight		All		18.4		grams
Case Material	Black Coated Copper					
Base plate Material	Non-Conductive Base					
Potting Material	UL 94V-0					
Pin Material	Base: Copper with Steel Plating: Barrel Tin					
Shock/Vibration	MIL-STD-810F Compliant					
Humidity	95% RH max. Non Condensing					
Altitude	2000m Operating Altitude					
Thermal Shock	MIL-STD-810F					
Application Note Link	<a href="#">EC7AW Series App Notes</a>					
Packaging Information Link	<a href="#">Packaging Information</a>					

## CHARACTERISTIC CURVE

### Power Derating Curve



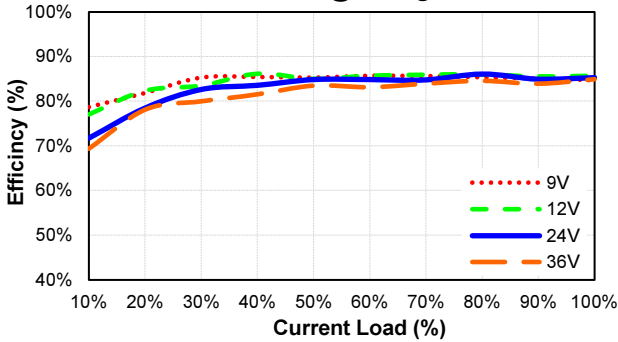
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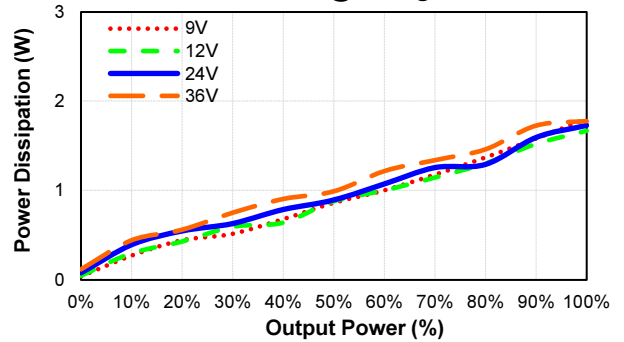


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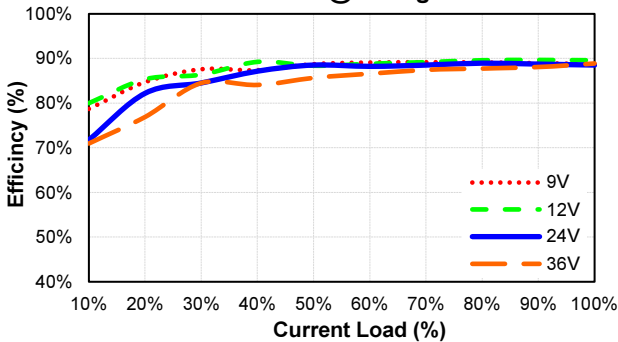
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Eff Vs Io @25 Deg. C



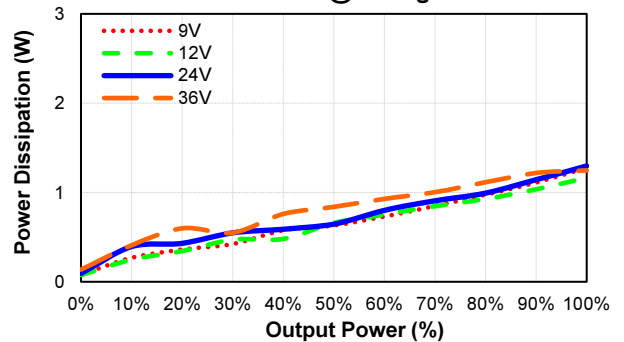
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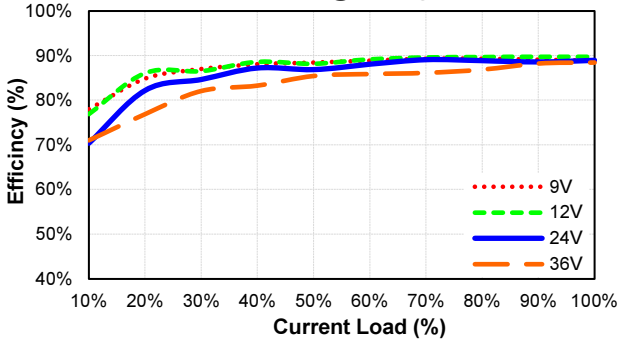
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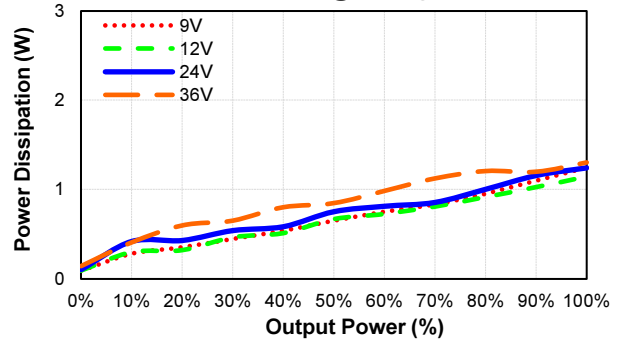
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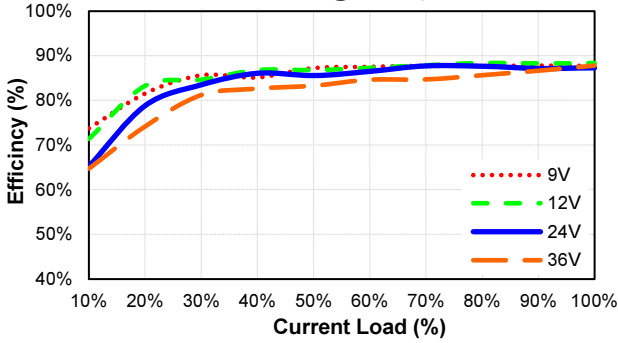
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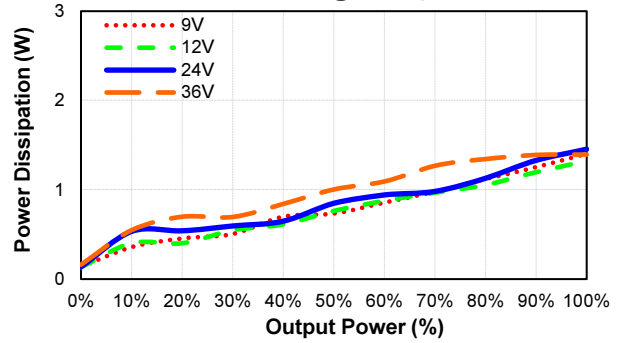
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**EC7AW-24D12**  
Eff Vs Io @25 Deg. C



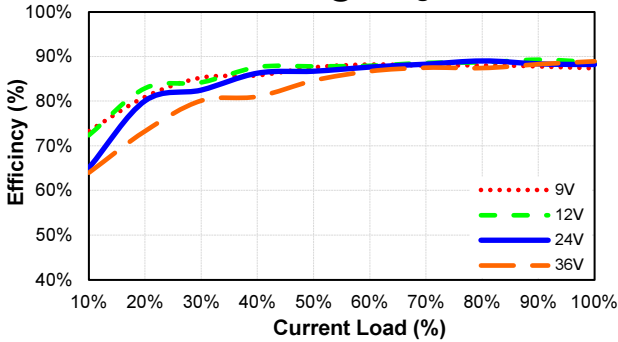
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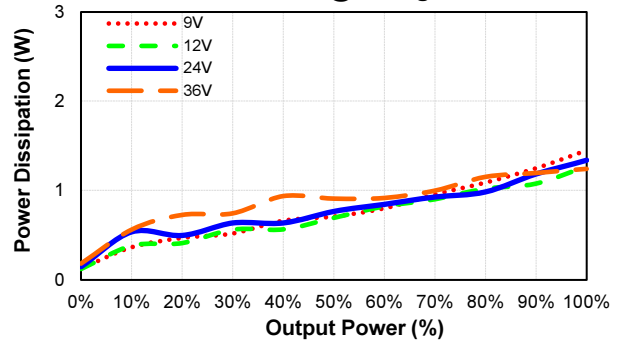


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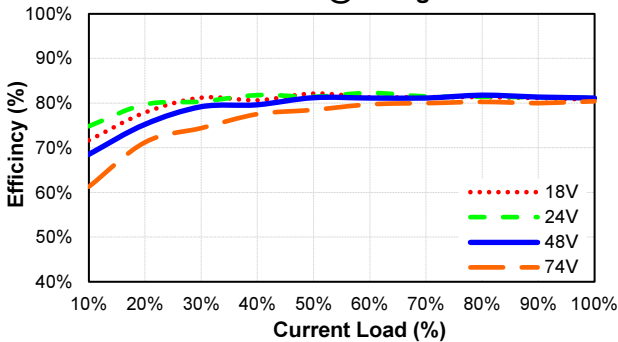
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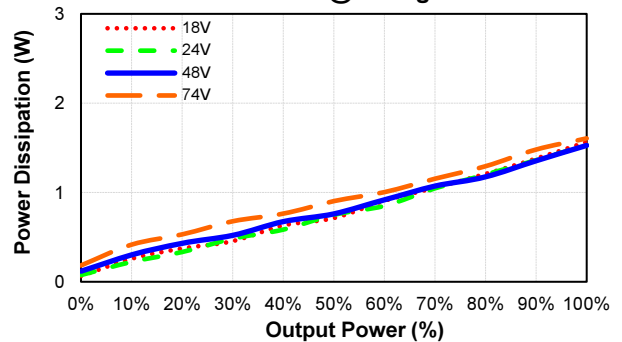
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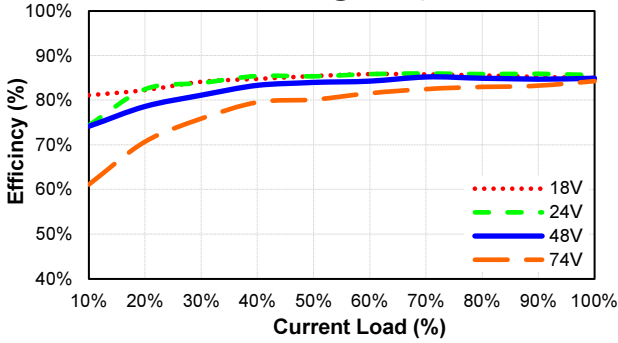
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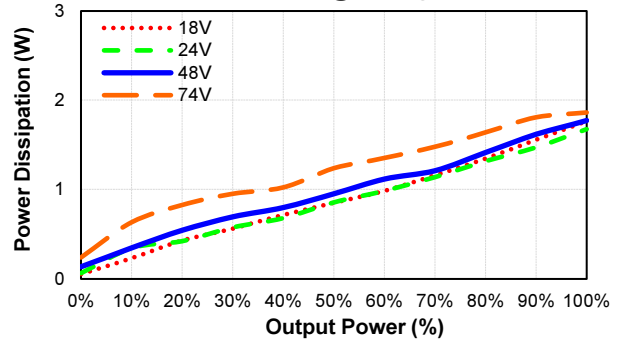
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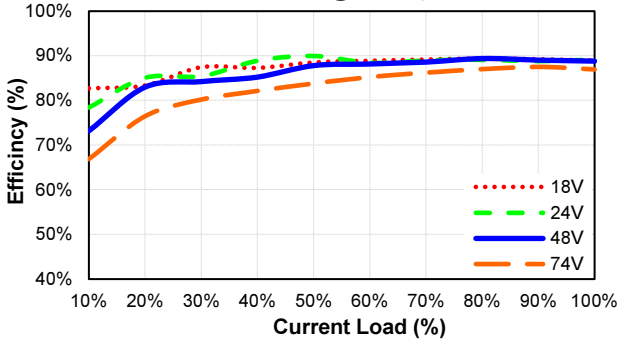
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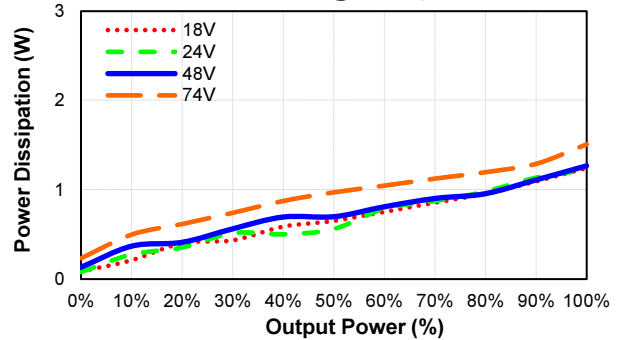
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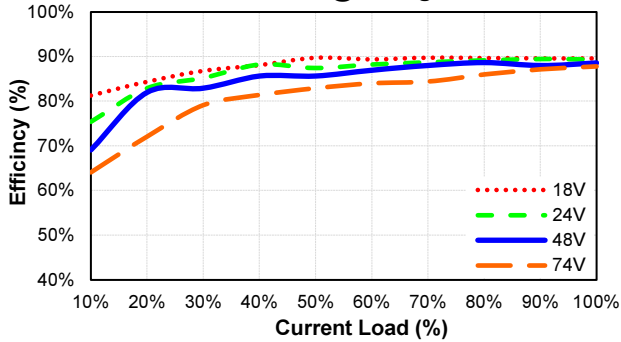
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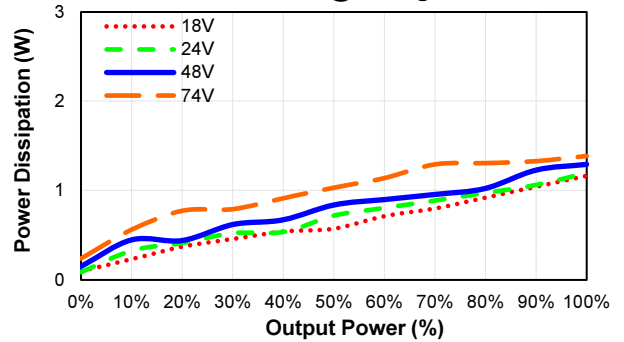


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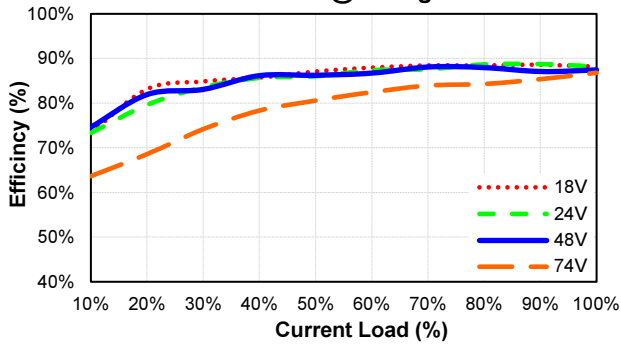
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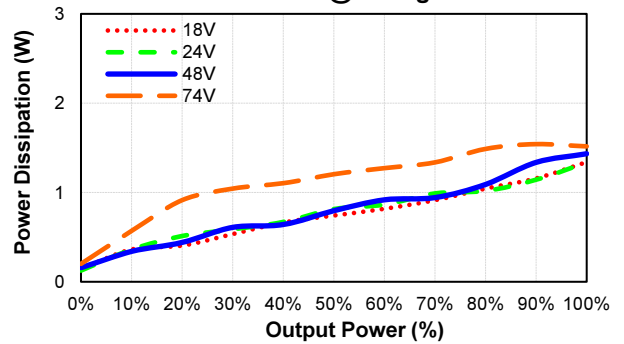
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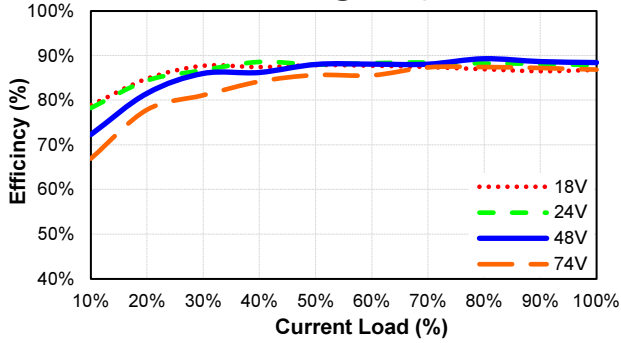
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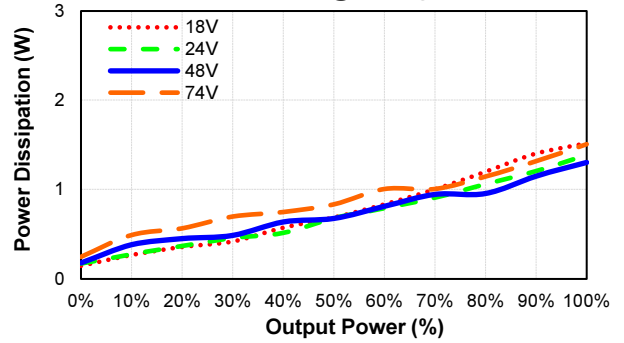
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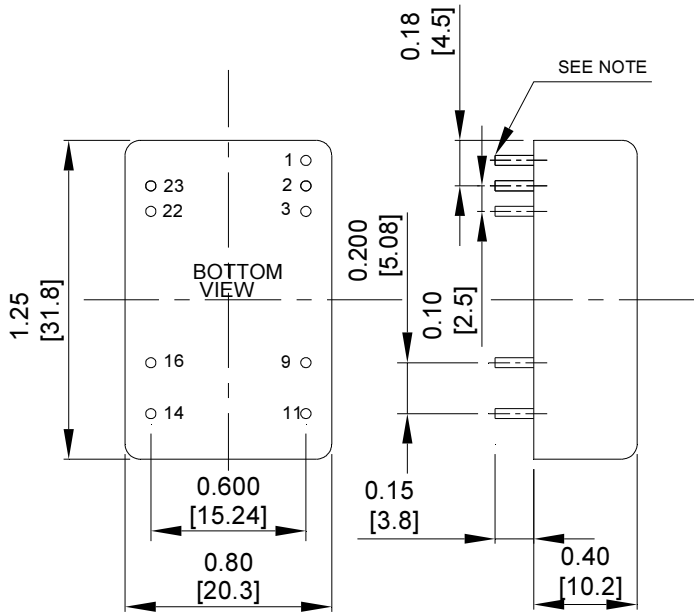
**EC7AW-48D15**  
Pd Vs Po @25 Deg. C





# EC7AW Series

## 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