



# EC7BW18 SERIES 20 WATT 18:1 INPUT ISOLATED DC-DC CONVERTER

## Features

- Efficiency up to 90%
- Fixed Switching Frequency
- Regulated Outputs
- Remote On/Off
- Low No Load Power Consumption
- Fully protected (OTP/OCP/OVP/UVLO)
- 3000Vac I/O Isolation
- Operating Case Temperature -40 to +105°C
- 2"x1"x0.4" Size Meet Industrial Standard
- CB Test Certificate IEC62368-1
- EN50155 Compliant with External Circuits
- UL62368-1 2nd (Reinforce Insulation) Approval
- Shock & Vibration EN50155 (EN61373) Compliant
- Fire & Smoke EN45545-2 Compliant
- 5000m Operating Altitude



MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT		INPUT CURRENT		% EFF.		CAPACITOR LOAD MAX.
			MIN.	MAX.	NO LOAD	FULL LOAD	(1)	(2)	
EC7BW18-72S05	8.5-160 VDC	5 VDC	0 mA	4000 mA	5 mA	323 mA	86	85	6800uF
EC7BW18-72S12	8.5-160 VDC	12 VDC	0 mA	1670 mA	8 mA	312 mA	89	88	3300uF
EC7BW18-72S15	8.5-160 VDC	15 VDC	0 mA	1330 mA	8 mA	312 mA	89	88	2200uF
EC7BW18-72D12	8.5-160 VDC	±12 VDC	0 mA	±833 mA	8 mA	312 mA	89	88	820µF
EC7BW18-72D15	8.5-160 VDC	±15 VDC	0 mA	±667 mA	8 mA	312 mA	89	88	680µF
EC7BW18-72D24	8.5-160 VDC	±24 VDC	0 mA	±417 mA	8 mA	309 mA	90	89	330µF

**NOTE:**

1. Nominal Input Voltage 72 VDC
2. Measured at 110Vin
3. To meet EN50155 and RIA12 refer to application note.

## PART NUMBER

Series	Nominal Input Voltage	Number of Outputs	Nominal Output Voltage	Remote On/Off Logic
EC7BW18-	II	O	XX	L
EC7BW18	72: 72 VDC	S: Single D: Dual	05: 5.0VDC 12: 12VDC 15: 15VDC 24: 24VDC	None: Positive N: Negative

**Part Number Example:**

**EC7BW18-72S12N:** 2"x1", 20W, 18:1 8.5-160Vdc Input, Single 12Vdc Output, Negative Logic



# EC7BW18 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	All	-0.3		160	V <sub>dc</sub>
Input Surge Voltage	100ms max.	All			200	V <sub>dc</sub>
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		All	8.5	72	160	V <sub>dc</sub>
Input Under Voltage Lockout						
Turn-On Voltage Threshold	70% Load	All	8.5	9	9.5	V <sub>dc</sub>
Turn-Off Voltage Threshold	70% Load	All	7	7.5	8	V <sub>dc</sub>
Lockout Hysteresis Voltage	70% Load	All		1.5		V <sub>dc</sub>
Maximum Input Current	V <sub>in</sub> =12V, Full Load	All			2.2	A
	V <sub>in</sub> =8.5V, 70% Load					
No-Load Input Current	V <sub>in</sub> =72V, 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> =72V, Full Load, T <sub>c</sub> =25°C	All	-1.0		+1.0	%
Output Voltage Balance	V <sub>in</sub> =72V, Full Load, T <sub>c</sub> =25°C	Dual	-1.0		+1.0	%
Output Voltage Regulation						
Load Regulation	Full Load to No Load	Single			±0.2	%
		Dual			±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 105°C	All			±0.02	%/°C
Output Voltage Ripple and Noise (5Hz to 20MHz bandwidth)						
Peak-to-Peak	Full load, 1.0uF ceramic capacitors.	5Vo			75	mV
		Others			100	
RMS		All			40	mV
Output Current Range	V <sub>in</sub> = 8.5 to 12V	See Power Derating Curve				A
	V <sub>in</sub> = 12 to 160V	See Model Number Table				
Over Current Protection	Hiccup Mode. Auto Recovery.	All	110	150	180	%
Short Circuit Protection		All	Continuous, Auto Recovery.			
External Load Capacitance	Full load (resistive)	See Model Number Table				uF
Output Voltage Trim Range	P <sub>o</sub> ≤ max rated power, I <sub>o</sub> ≤ I <sub>o,max</sub>	Single	-20		+15	%
Over Voltage Protection	Zener Clamp	5Vo		6.2		V <sub>dc</sub>
		12Vo		15		
		15Vo		18		
		±12Vo		±15		
		±15Vo		±18		
		±24Vo		±30		



# EC7BW18 Series

## EFFICIENCY

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
100% Load	V <sub>in</sub> =72V, 110V	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 <sub>o_max</sub> step load change d/d <sub>t</sub> =0.1A/us (within 1% V <sub>out</sub> 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 <sub>on/off</sub> to 10%V <sub>o_set</sub> , Remote On	All		5		ms
Turn-On Delay Time, From Input	V <sub>in_min</sub> to 10%V <sub>o_set</sub> , Power Up	All		5		ms
Output Voltage Rise Time	10%V <sub>o_set</sub> to 90%V <sub>o_set</sub>	5V <sub>o</sub>		10		ms
		Others		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			3000	V <sub>ac</sub>
					4200	V <sub>dc</sub>
Isolation Resistance	Input to Output	All	1000			MΩ
Isolation Capacitance	Input to Output (10KHz, 0.25V)	All		20		pF

## FEATURE CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Switching Frequency	Output Ripple Frequency	All	180	200	220	KHz
On/Off Control, Positive Remote On/Off logic, Refer to -V <sub>in</sub> pin.						
Logic Low (Module Off)	V <sub>on/off</sub> at I <sub>on/off</sub> =1.0mA	All	0		1.2	V
Logic High (Module On)	V <sub>on/off</sub> at I <sub>on/off</sub> =0.0uA, Pin open=On	All	4.0 or Open Circuit		160	V
On/Off Control, Negative Remote On/Off logic, Refer to -V <sub>in</sub> pin						
Logic High (Module Off)	V <sub>on/off</sub> at I <sub>on/off</sub> =0.0uA, Pin open=Off	All	4.0 or Open Circuit		160	V
Logic Low (Module On)	V <sub>on/off</sub> at I <sub>on/off</sub> =1.0mA	All	0		1.2	V
On/Off Current (for both remote on/off logic)	I <sub>on/off</sub> at V <sub>on/off</sub> =0V	All		0.4	1	mA
Leakage Current (for both remote on/off logic)	Logic High, V <sub>on/off</sub> =15V	All			30	uA
Off Converter Input Current	Shutdown input idle current	All		3	5	mA
Over Temperature Shutdown	Temperature at the Center Part of Case, Non-Latching	All		110		°C
Over Temperature Recovery		All		92		°C

## GENERAL SPECIFICATIONS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
MTBF	I <sub>o</sub> =100% of I <sub>o_max</sub> ; MIL-HDBK - 217F_Notice 1, GB, 25°C	5V <sub>o</sub>		1242		K hours
		12V <sub>o</sub>		1397		
		15V <sub>o</sub>		1631		
		±12V <sub>o</sub>		1341		
		±15V <sub>o</sub>		1571		
		±24V <sub>o</sub>		1622		
Weight		All		28.5		grams
Case Material	Plastic, DAP, UL 94V-0					
Base plate Material	FR4					



# EC7BW18 Series

Potting Material	UL 94V-0	
Pin Material	Base: Copper Plating: Nickel with Matte Tin	
Shock/Vibration	MIL-STD-810F/EN61373 Compliant	
Humidity	95% RH max. Non Condensing	
Altitude	5000m Operating Altitude, 12000m Transport Altitude	
Thermal Shock	MIL-STD-810F	
Fire & Smoke	EN45545-2 Compliant	
EMI	Meets EN55032 & EN50155 Compliant (with external filter)	Class A
ESD	EN61000-4-2 Level 3: Air $\pm 8$ kV, Contact $\pm 6$ kV	Perf. Criteria A
Radiated immunity	EN61000-4-3 Level 3: 80~1000MHz, 20V/m	Perf. Criteria A
Fast Transient	EN61000-4-4 Level 3: On power input port, $\pm 2$ kV, external input capacitor required,	Perf. Criteria A
Surge	EN61000-4-5 Level 4: Line to earth, $\pm 4$ kV, Line to line, $\pm 2$ kV	Perf. Criteria A
Conducted immunity	EN61000-4-6 Level 3: 0.15~80MHz, 10V	Perf. Criteria A
Interruptions of Voltage Supply	EN50155 Class S3: 20ms interruptions	Perf. Criteria A
Supply Change Over	EN50155 Class C2: During a supply break of 30 ms,	Perf. Criteria A
Application Note Link	<a href="#">EC7BW18-72S Series App Notes</a>	
Packaging Information Link	<a href="#">Packaging Information</a>	

## Immunity to Environmental Conditions

Phenomenon	EN50155; 2017 Reference Clause(s)	Reference Standard	Test Conditions	Result
Low Temperature Start-up test	13.4.4	EN 60068-2-1	Class OT4 Temperature: $-40^{\circ}\text{C}$ Duration: 2 hrs	Pass
Dry Heat Test	13.4.5	EN 60068-2-2	Class OT4 & ST2 Temperature: $70^{\circ}\text{C}$ Duration: 6 hrs Extended temperature: $85^{\circ}\text{C}$ Extended Duration: 10min	Pass
Low Temperature Storage Test	13.4.6	EN 60068-2-1	Temperature: $-40^{\circ}\text{C}$ Duration: 16 hrs	Pass
Cyclic Damp Heat Test	13.4.7	EN 60068-2-30	Temperature: $25^{\circ}\text{C} - 55^{\circ}\text{C}$ Humidity: 90% RH Duration: 48 hrs	Pass
Random Vibration Test	13.4.11	EN 61373	Temperature: $25^{\circ}\text{C} \pm 10^{\circ}\text{C}$ Humidity: 50% $\pm 25\%$ RH Frequency range: 5 ~ 150 Hz Vertical: $1.01 \text{ m/s}^2$ Transverse: $0.450 \text{ m/s}^2$ Longitudinal: $0.700 \text{ m/s}^2$ Duration: 10 min / axis	Pass
Simulated Long Life Test at Increased Random Vibration Levels	13.4.11	EN 61373	Temperature: $25^{\circ}\text{C} \pm 10^{\circ}\text{C}$ Humidity: 50% $\pm 25\%$ RH Frequency range: 5 ~ 150 Hz Vertical: $5.72 \text{ m/s}^2$ Transverse: $2.55 \text{ m/s}^2$ Longitudinal: $3.96 \text{ m/s}^2$ Duration: 5 hrs / axis	Pass
Shock Test	13.4.11	EN 61373	Temperature: $25^{\circ}\text{C} \pm 10^{\circ}\text{C}$ Humidity: 50% $\pm 25\%$ RH Frequency range: 5 ~ 150 Hz $\pm$ -Vertical: $30 \text{ m/s}^2$ $\pm$ -Transverse: $30 \text{ m/s}^2$ $\pm$ -Longitudinal: $50 \text{ m/s}^2$ Duration: 30ms x18 (Each axis 3 shocks)	Pass



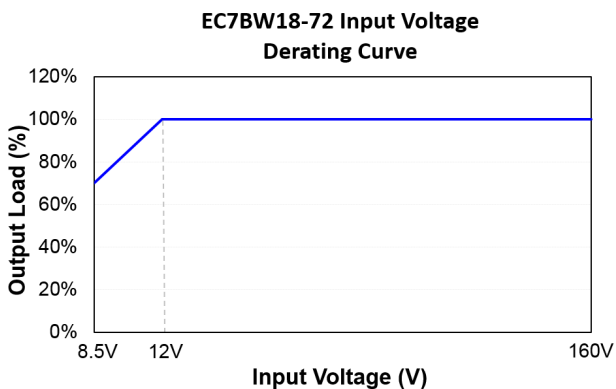
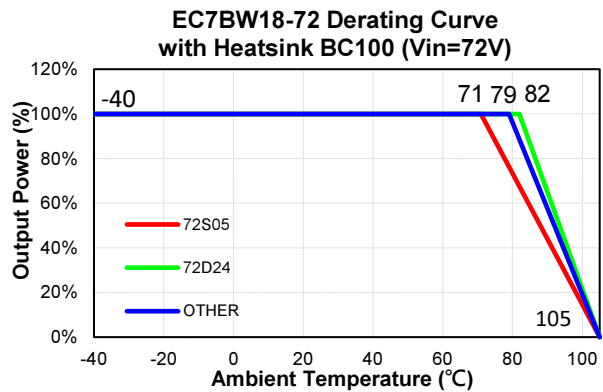
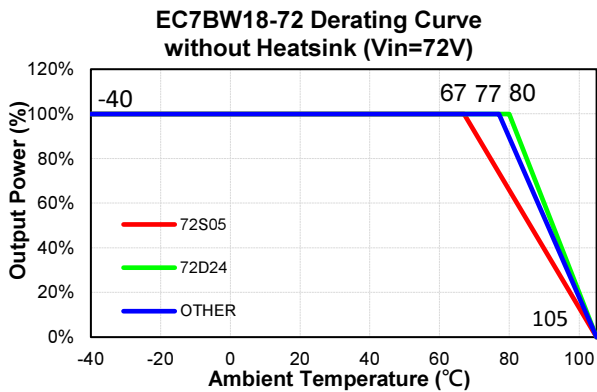
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## EN45545-2 Fire & Smoke Test Conditions

Item		Standard	Hazard Level
R22	Oxygen Index Test	EN 45545-2: 2013 EN ISO 4589-2: 2006	HL1, HL2, HL3
	Smoke Density Test	EN 45545-2: 2013 EN ISO 5659-2: 2013	HL1, HL2, HL3
	Smoke Toxicity Test	EN 45545-2: 2013 NF X70-100: 2006	HL1, HL2, HL3
R23	Oxygen Index Test	EN 45545-2: 2013 EN ISO 4589-2: 2006	HL1, HL2, HL3
	Smoke Density Test	EN 45545-2: 2013 EN ISO 5659-2: 2013	HL1, HL2, HL3
	Smoke Toxicity Test	EN 45545-2: 2013 NF X70-100: 2006	HL1, HL2, HL3
R24	Oxygen Index Test	EN45545-2: 2013 EN ISO 4589-2	HL1, HL2, HL3
R25	Glow - Wire Test	EN 45545-2:2013 EN 60695-2-11:2001	HL1, HL2, HL3
R26	Vertical Flame Test	EN 45545-2: 2013 EN 60695-11-10: 2013	HL1, HL2, HL3

## CHARACTERISTIC CURVE

### Power Derating Curve

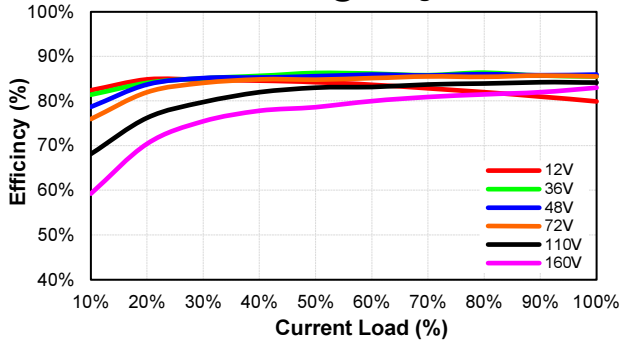




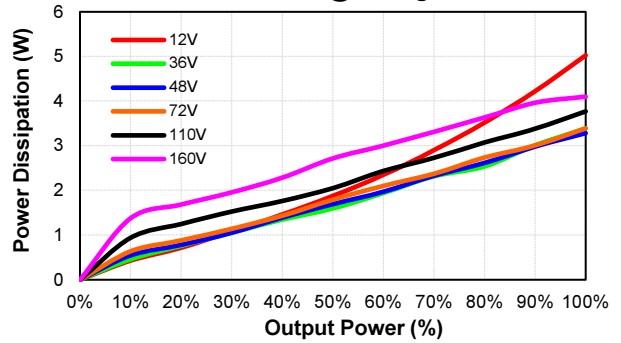
# EC7BW18 Series

## Performance Data

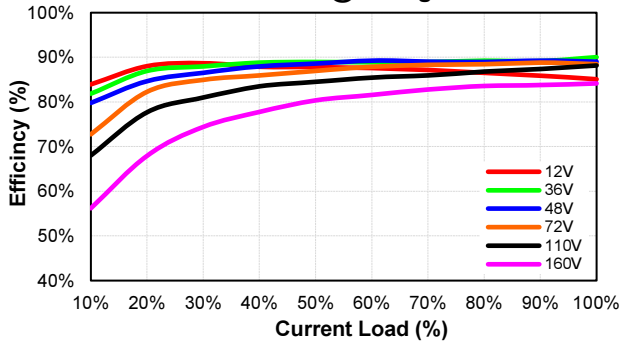
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Eff Vs Io @25 Deg. C



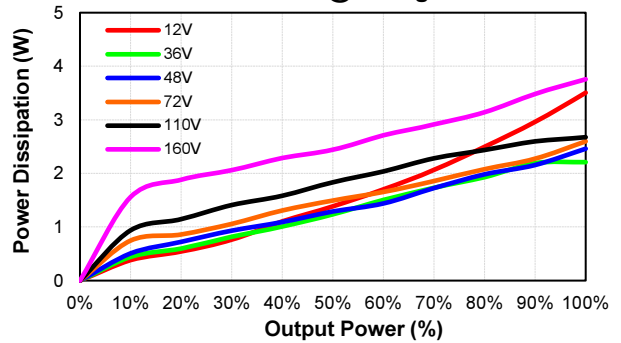
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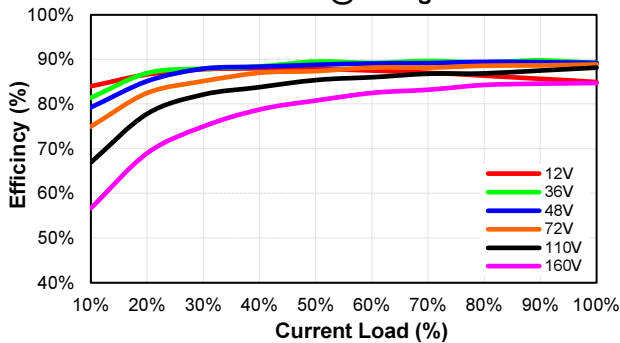
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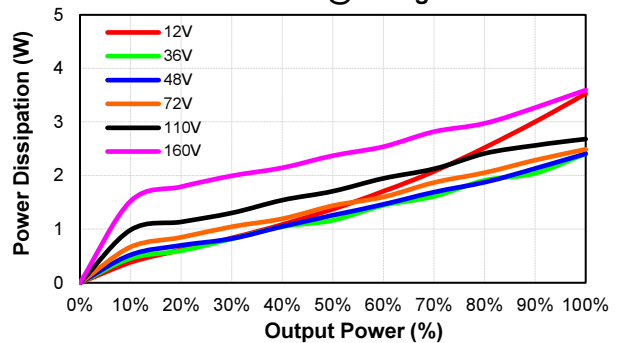
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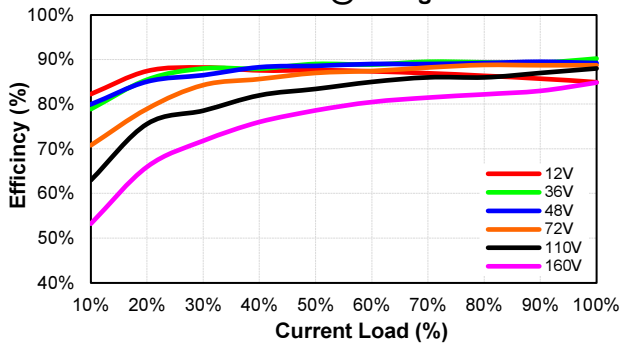
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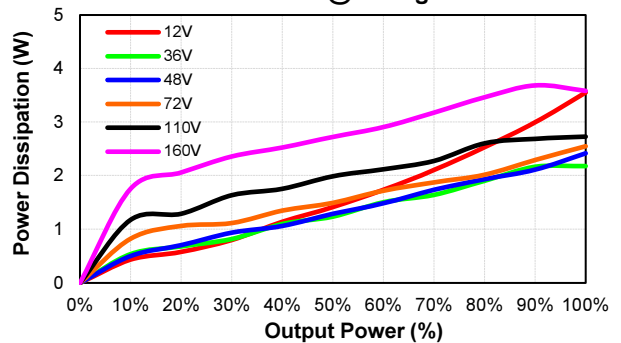
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**EC7BW18-72D12**  
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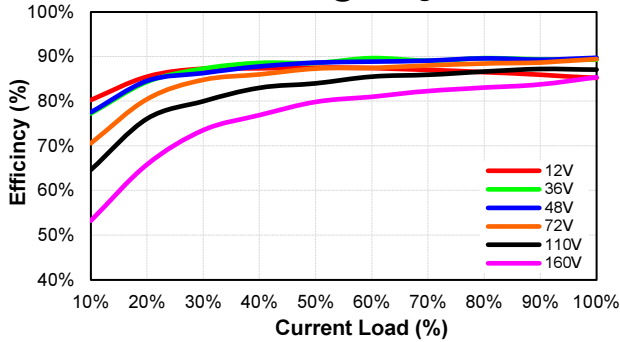
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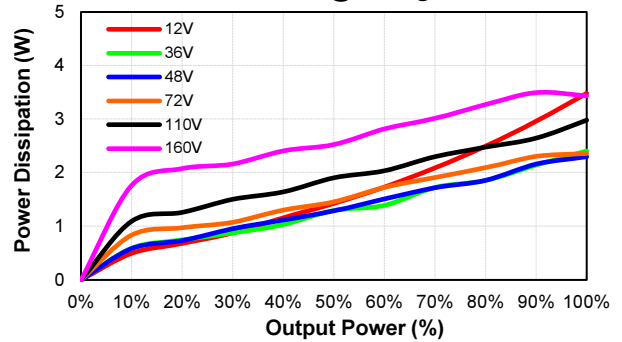


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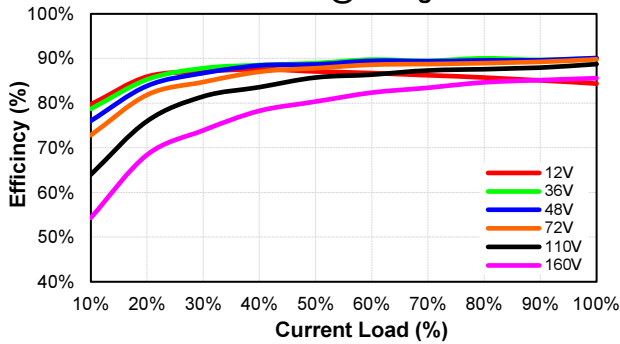
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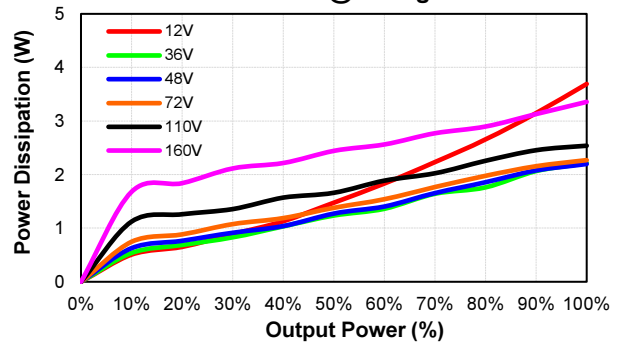
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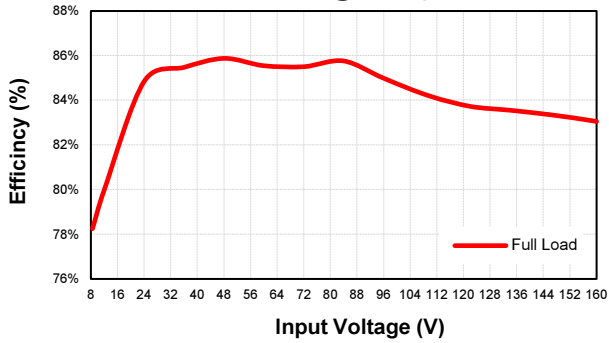
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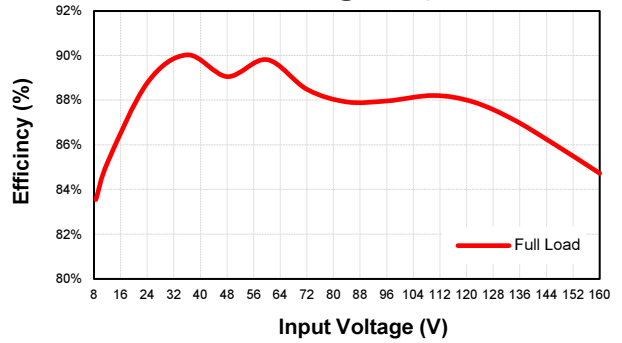
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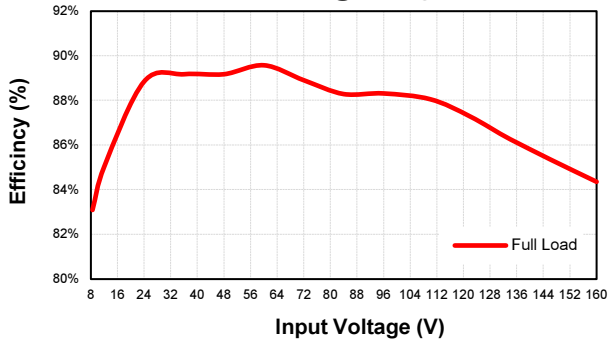
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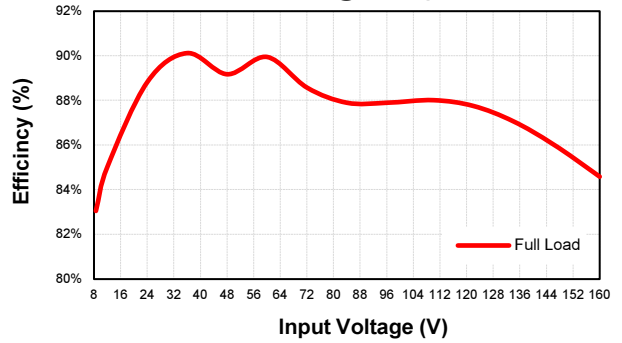
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**EC7BW18-72S15**  
Eff Vs Io @25 Deg. C



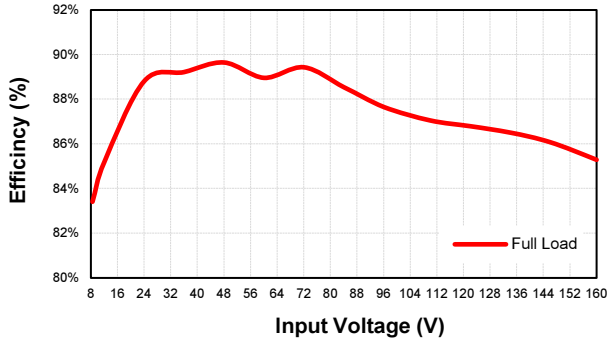
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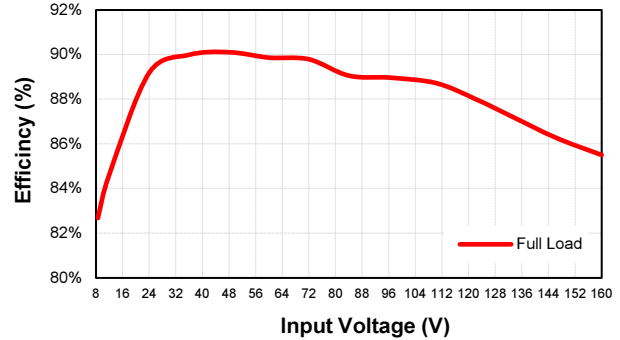


# EC7BW18 Series

**EC7BW18-72D15**  
Eff Vs Io @25 Deg. C

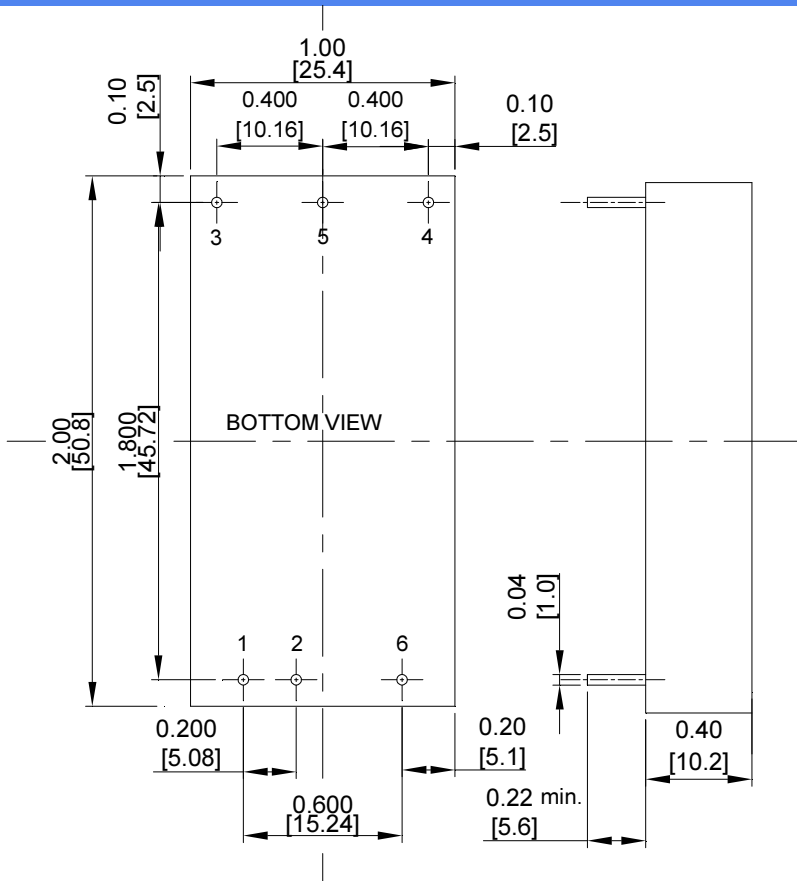


**EC7BW18-72D12**  
Eff Vs Io @25 Deg. C



Note: 8.5Vin Efficiency at 70% Full Load

## MECHANICAL SPECIFICATION



PIN CONNECTION		
Pin	Single	Dual
1	+V Input	+V Input
2	-V Input	-V Input
3	+V Output	+V Output
4	Trim	-V Output
5	-V Output	Common
6	Remote On/Off	

NOTE: Pin Size is 0.04±0.004 Inch (1.0±0.1 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

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