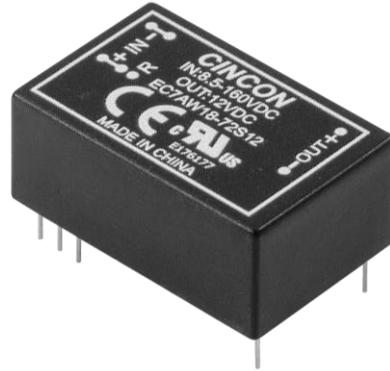




# EC7AW18 SERIES 10 WATT 18:1 INPUT ISOLATED DC-DC CONVERTER

## Features

- Efficiency up to 88%
- Fixed Switching Frequency
- Regulated Outputs
- Remote On/Off
- Low No Load Power Consumption
- Fully protected (OCP/OVP/UVLO)
- 3000Vac I/O Isolation
- Operating Ambient Temperature -40 to +100°C
- 1.25"x0.8"x0.5" Size Meet Industrial Standard
- CB Test Certificate IEC62368-1
- EN55032/EN55035/EN50155 Compliant with External Circuits
- UL62368-1 3rd (Reinforced 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)	
EC7AW18-72S05	8.5-160 VDC	5 VDC	0 mA	2000 mA	6 mA	166 mA	84	82	2000µF
EC7AW18-72S12	8.5-160 VDC	12 VDC	0 mA	835 mA	6 mA	158 mA	88	85	835µF
EC7AW18-72S15	8.5-160 VDC	15 VDC	0 mA	668 mA	6 mA	158 mA	88	85	668µF
EC7AW18-72D05	8.5-160 VDC	±5 VDC	0 mA	±1000 mA	6 mA	168 mA	83	82	1000µF
EC7AW18-72D12	8.5-160 VDC	±12 VDC	0 mA	±416 mA	6 mA	160 mA	87	85	416µF
EC7AW18-72D15	8.5-160 VDC	±15 VDC	0 mA	±333 mA	6 mA	160 mA	87	85	333µF

**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
EC7AW18-	II	O	XX	
EC7AW18	72 : 72 VDC	S : Single  D : Dual	05 : 5.0VDC 12 : 12VDC 15 : 15VDC 05 : ±5 VDC 12 : ±12 VDC 15 : ±15 VDC	Positive

**Part Number Example:**

**EC7AW18-72S12:** 1.25"x0.8", 10W, 18:1 8.5-160Vdc Input, Single 12Vdc Output, Positive Logic



# EC7AW18 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 Ambient Temperature	With derating	All	-40		100	°C
Maximum Case Temperature	At the center part of case plate	All			100	°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	80% Load	All	8.2	9	9.5	V <sub>dc</sub>
Turn-Off Voltage Threshold	80% Load	All	6.9	7.5	8.0	V <sub>dc</sub>
Lockout Hysteresis Voltage	80% Load	All		1.5		V <sub>dc</sub>
Maximum Input Current	V <sub>in</sub> =12V, Full load	All			1.3	A
	V <sub>in</sub> =8.5V, 80% load					
No-Load Input Current	V <sub>in</sub> =72V, I <sub>o</sub> =0A	See Model Number Table				mA
Input Filter	LC 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			±0.5	%
		Dual			±1.0	
Line Regulation	V <sub>in</sub> =High line to low line, full load	All			±0.2	%
Cross Regulation	Load cross variation 25%/100%	Dual			±5.0	%
Temperature Coefficient	T <sub>c</sub> =-40°C to 100°C	All			±0.02	%/°C
Output Voltage Ripple and Noise (5Hz to 20MHz bandwidth)						
Peak-to-Peak	Full load, 2.2uF ceramic capacitors.	All			100	mV
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
Over Voltage Protection	Zener clamp (single output only)	5Vo			6.2	V <sub>dc</sub>
		12Vo			15	
		15Vo			18	



# EC7AW18 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 <sub>i</sub> /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>	All		10		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 (100KHz, 0.25V)	All		16		pF

## FEATURE CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Switching Frequency	Output ripple frequency	All	230	255	280	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	3.5 or Open Circuit		160	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		1.5	3	mA

## 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	5Vo		1654		K hours
		12Vo		2295		
		15Vo		2363		
		±5Vo		1664		
		±12Vo		2093		
		±15Vo		2335		
Weight		All		16		grams
Case Material	Plastic, DAP, UL 94V-0					
Base Material	Plastic, LCP, UL 94V-0					
Potting Material	UL 94V-0					
Pin Material	Base: Copper plated steel wire Plating: Tin					



# EC7AW18 Series

## GENERAL SPECIFICATIONS

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	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 (EN50155) Level 3: Line to earth, $\pm 2$ kV, Line to line, $\pm 1$ kV (EN55035)	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 30ms	Perf. Criteria A
Application Note Link	<a href="#">EC7AW18-72 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°C Duration: 2 hrs	Pass
Dry Heat Test	13.4.5	EN 60068-2-2	Class OT4 & Cycle B Temperature: 70°C Duration: 6 hrs Extended temperature: 85°C Extended Duration: 10min	Pass
Low Temperature Storage Test	13.4.6	EN 60068-2-1	Temperature: -40°C Duration: 16 hrs	Pass
Cyclic Damp Heat Test	13.4.7	EN 60068-2-30	Temperature: 25°C - 55°C Humidity: 90% RH Duration: 48 hrs	Pass
Random Vibration Test	13.4.11	EN 61373	Temperature: 25°C +/- 10°C Humidity: 50% +/-25% RH Frequency range: 5 ~ 150 Hz Vertical: 1.01 m/s <sup>2</sup> Transverse: 0.450 m/s <sup>2</sup> Longitudinal: 0.700 m/s <sup>2</sup> Duration: 10 min / axis	Pass
Simulated Long Life Test at Increased Random Vibration Levels	13.4.11	EN 61373	Temperature: 25°C +/-10°C Humidity: 50% +/-25% RH Frequency range: 5 ~ 150 Hz Vertical: 5.72 m/s <sup>2</sup> Transverse: 2.55 m/s <sup>2</sup> Longitudinal: 3.96 m/s <sup>2</sup> Duration: 5 hrs / axis	Pass
Shock Test	13.4.11	EN 61373	Temperature: 25°C +/-10°C Humidity: 50% +/-25% RH Frequency range: 5 ~ 150 Hz +/-Vertical: 30 m/s <sup>2</sup> +/-Transverse: 30 m/s <sup>2</sup> +/-Longitudinal: 50 m/s <sup>2</sup> Duration: 30ms x18 (Each axis 3 shocks)	Pass



# EC7AW18 Series

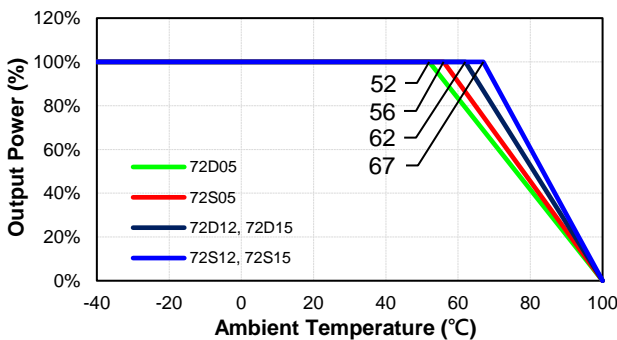
## EN45545-2 Fire & Smoke Test Conditions

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

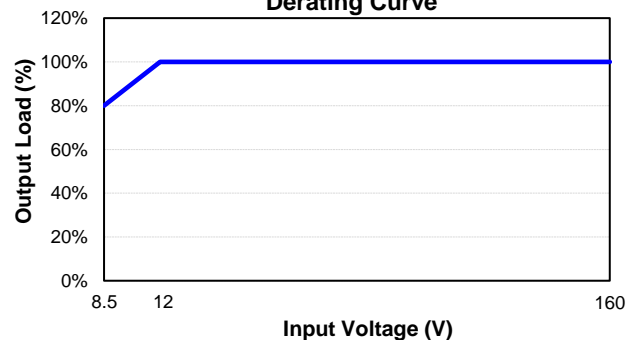
## CHARACTERISTIC CURVE

### Power Derating Curve

EC7AW18-72 Derating Curve (Vin=72V)

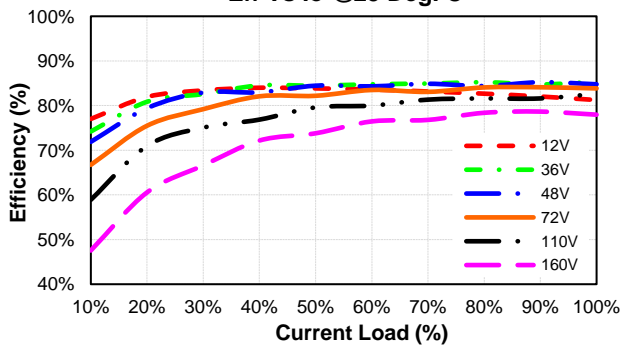


EC7AW18-72 Input Voltage Derating Curve

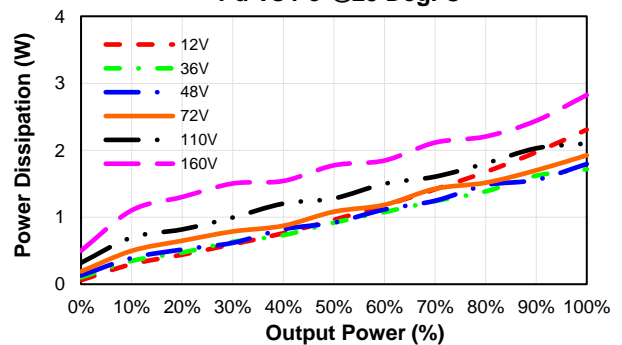


### Performance Data

EC7AW18-72S05 Eff Vs Io @25 Deg. C



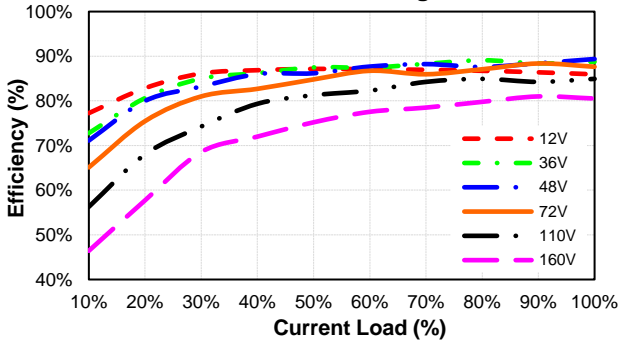
EC7AW18-72S05 Pd Vs Po @25 Deg. C



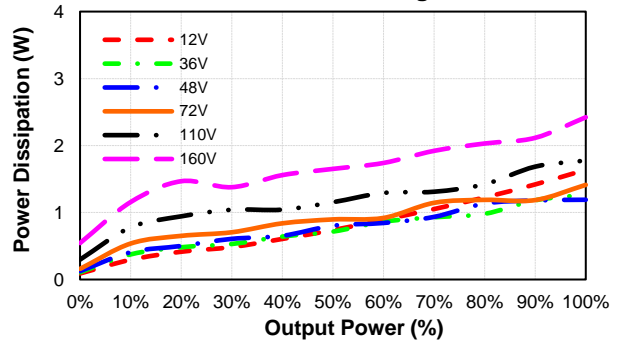


# EC7AW18 Series

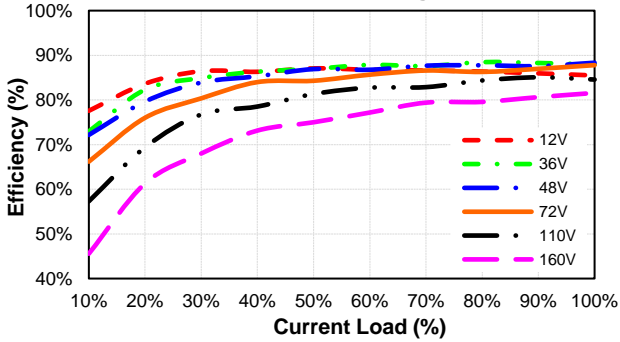
**EC7AW18-72S12**  
Eff Vs Io @25 Deg. C



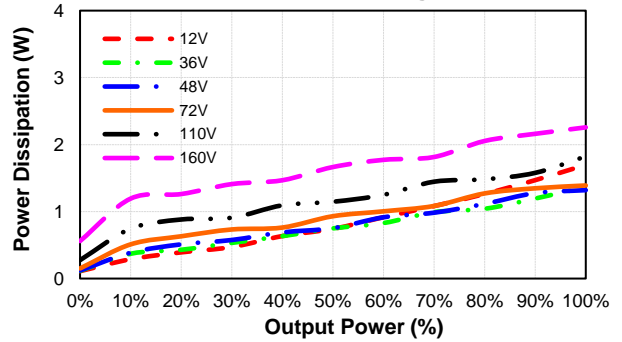
**EC7AW18-72S12**  
Pd Vs Po @25 Deg. C



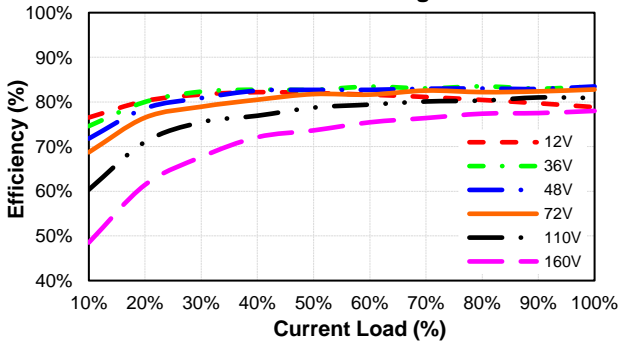
**EC7AW18-72S15**  
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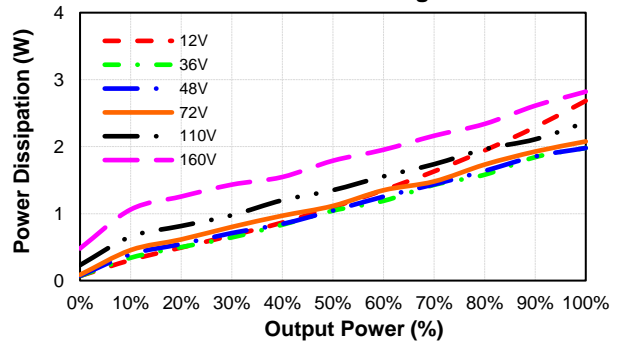
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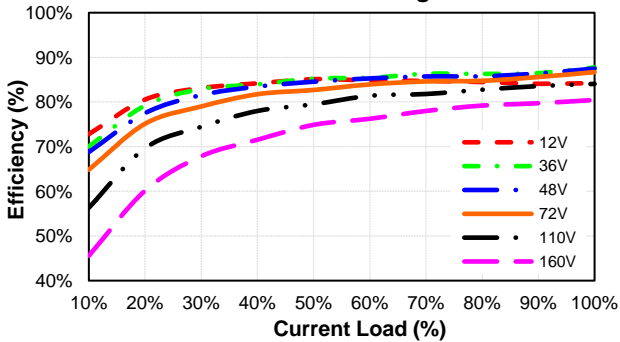
**EC7AW18-72D05**  
Eff Vs Io @25 Deg. C



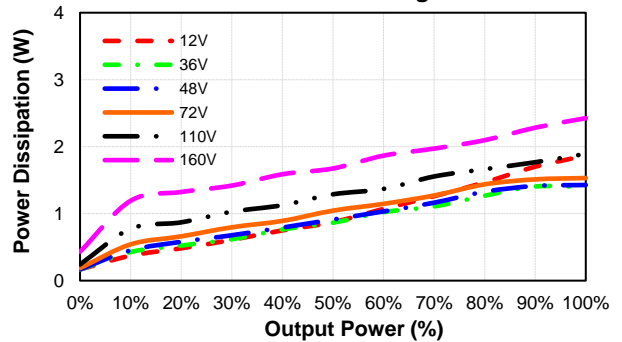
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**EC7AW18-72D12**  
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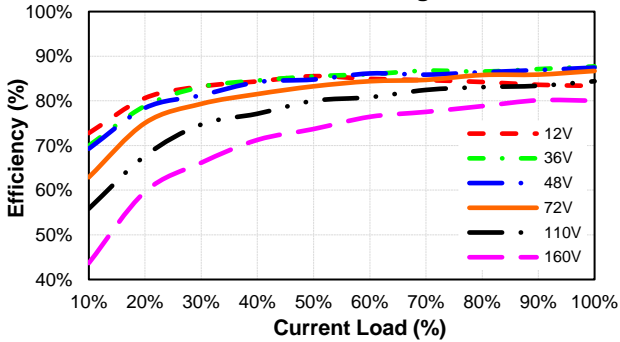
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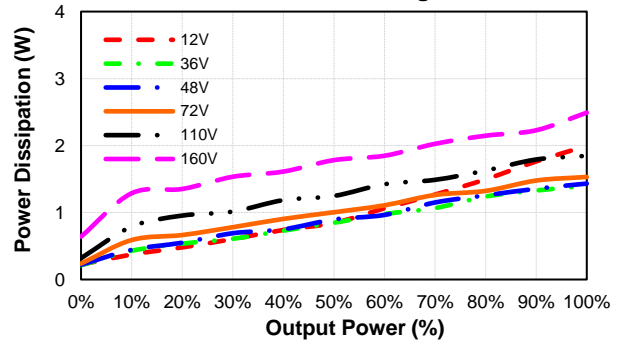


# EC7AW18 Series

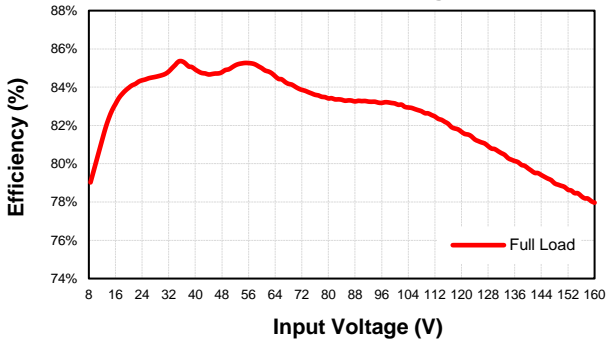
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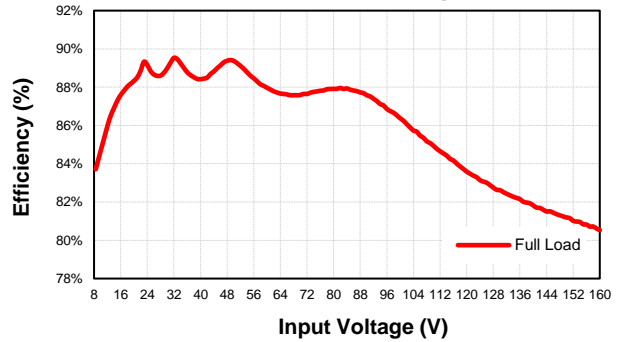
**EC7AW18-72D15**  
Pd Vs Po @25 Deg. C



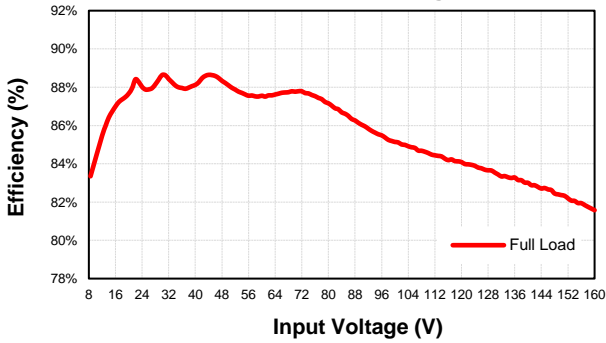
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Eff Vs Vin @25 Deg. C



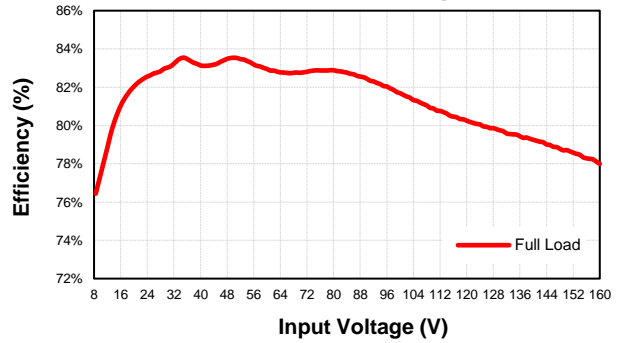
**EC7AW18-72S12**  
Eff Vs Vin @25 Deg. C



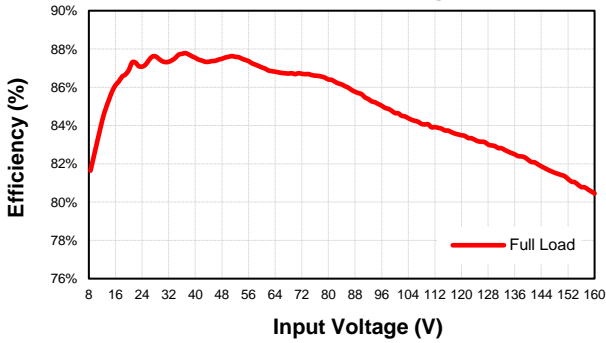
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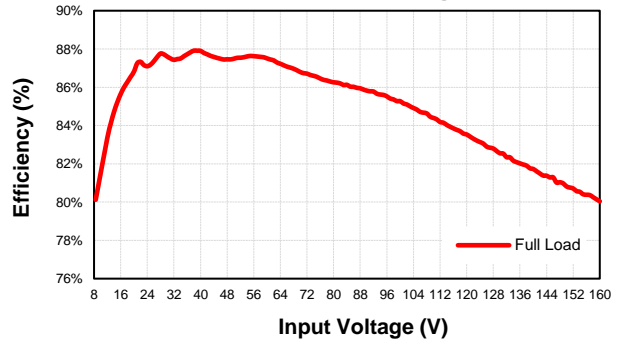
**EC7AW18-72D05**  
Eff Vs Vin @25 Deg. C



**EC7AW18-72D12**  
Eff Vs Vin @25 Deg. C



**EC7AW18-72D15**  
Eff Vs Vin @25 Deg. C

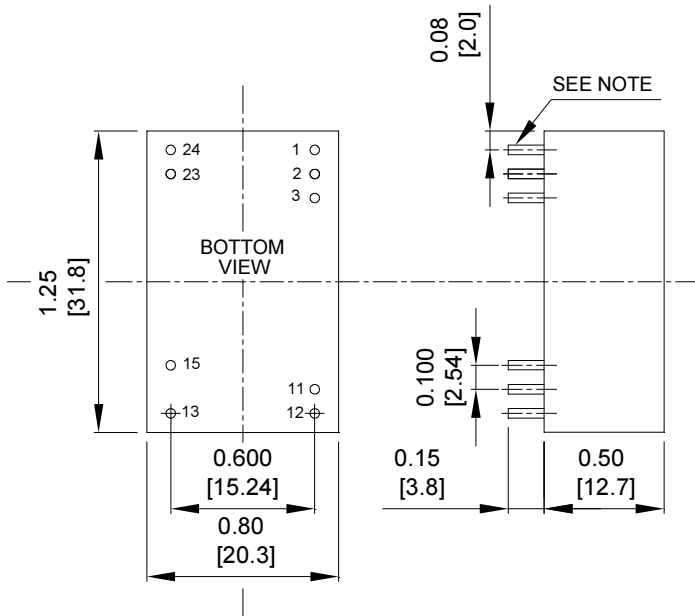


Note: 8.5Vin Efficiency at 80% Full Load



# EC7AW18 Series

## MECHANICAL SPECIFICATION



### CASE A

NOTE: Pin Size is  $0.02 \pm 0.002$  Inch ( $0.5 \pm 0.05$ mm) DIA  
All Dimensions In Inches (mm)

Tolerances Inches: X.XX =  $\pm 0.02$ , X.XXX =  $\pm 0.010$

Millimeters: X.X =  $\pm 0.5$ , X.XX =  $\pm 0.25$

PIN CONNECTION		
Pin	Single Output	Dual Output
1	+V Input	+V Input
2	+V Input	+V Input
3	Remote On/Off	Remote On/Off
11	NP	Common
12	-V Output	NP
13	+V Output	-V Output
15	NP	+V Output
23	-V Input	-V Input
24	-V Input	-V Input

\* NC-NO CONNECTION WITH PIN

\* NP-NO PIN