



# EC7AW18 ECRT/EDRT SERIES 10 WATT 16:1 INPUT ISOLATED DC-DC CONVERTERS

## Features

- Efficiency Up to 87%
- Fixed Switching Frequency
- Regulated Outputs
- Negative Logic Remote On/Off
- Low No Load Power Consumption
- Fully protected (OCP/OVP/UVLO)
- 3000Vac I/O Isolation
- Operating Case Temperature -40 to +100°C
- UL62368-1 3<sup>rd</sup> (Reinforced Insulation) Approval for DC Modules
- Compliant with EN55032/EN55035/EN50155 EN50121-3-2/EN45545-2
- Safety Meets IEC/EN/UL 62368-1
- Chassis Mount, Baseplate Cooled
- Low Inrush Current
- Input Reverse Polarity Protection
- EN50155 Class S3/ Class C2 Criteria A Without External Capacitor
- Output LED Indicator
- 4.00"x2.14"x0.80" Size at ECRT
- 4.00"x2.14"x1.38" Size at EDRT



MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT		INPUT CURRENT		% EFF.	CAPACITOR LOAD MAX.
			MIN.	MAX.	NO LOAD	FULL LOAD		
EC7AW18-72S05-ZZZZW	10-160 VDC	5 VDC	0 mA	2000 mA	6 mA	170 mA	82	2000uF
EC7AW18-72S12-ZZZZW	10-160 VDC	12 VDC	0 mA	835 mA	6 mA	160 mA	87	835uF
EC7AW18-72S15-ZZZZW	10-160 VDC	15 VDC	0 mA	668 mA	6 mA	160 mA	87	668µF
EC7AW18-72D05-ZZZZW	10-160 VDC	±5 VDC	0 mA	±1000 mA	6 mA	172 mA	81	1000µF
EC7AW18-72D12-ZZZZW	10-160 VDC	±12 VDC	0 mA	±416 mA	6 mA	163 mA	85	416µF
EC7AW18-72D15-ZZZZW	10-160 VDC	±15 VDC	0 mA	±333 mA	6 mA	163 mA	85	333µF

**NOTE:**

1. Nominal Input Voltage 72 VDC.
2. Refer to Application Note for Thermal Resistance and Derating Information.
3. TVS is Included for Input Surge Voltage Protection.
4. Fuse & Shunt Diode is Include Inside for Input Reverse Polarity Protection.
5. CN1 & CN2 Connection: DINKLE 0137-1103 Series or Equivalent, Suitable Electric Wire: 26~16AWG (IEC 0.2~1.5mm<sup>2</sup>).
6. EC7AW18-72OXX-ZZZZW has De-Rating by Input Voltage is Required See Power Derating Curve.
7. EDRT with Din Mount, the Clip is Suitable for TS-35 Din Rail.

## PART NUMBER

Series	Nominal Input Voltage	Number of Outputs	Nominal Output Voltage	Chassis Mount Type	Coating
EC7AW18-	II	O	XX	-ZZZ	W
EC7AW18	72 : 72 VDC	S : Single D : Dual	05 : 5VDC 12 : 12VDC 15 : 15VDC	ECRT : Enclosed Chassis Mount + Railway Turnkey EDRT : Enclosed Chassis Mount + Din Rail + Railway Turnkey	None : Without Protective Coating P : With Protective Coating

**Part Number Example:**

**EC7AW18-72S12-EDRTP:** Enclosed Chassis Mount + Din Rail, 10W, 16:1 10-160Vdc Input, Single 12Vdc Output, With Protective Coating



# EC7AW18-ECRT/EDRT 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		100	°C
Storage Temperature		All	-40		105	°C

### INPUT CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units	
Operating Input Voltage		All	10	72	160	V <sub>dc</sub>	
Input Under Voltage Lockout							
Turn-On Voltage Threshold	80% Load	All	8.5	9.1	9.8	V <sub>dc</sub>	
Turn-Off Voltage Threshold	80% Load	All	7.9	8.4	9.0	V <sub>dc</sub>	
Lockout Hysteresis Voltage	80% Load	All		0.7		V <sub>dc</sub>	
Maximum Input Current	V <sub>in</sub> =14V, Full load	All		1.0		A	
Maximum Input Inrush Current	V <sub>in</sub> =160V, Full load	All			15	A	
No-Load Input Current	V <sub>in</sub> =72V, I <sub>o</sub> =0A	See Model Number Table					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	-1.2		+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			±1.5	%	
		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, 1uF ceramic capacitors	All				100	mV
RMS.						40	mV
Output Current Range	V <sub>in</sub> = 10 to 160V	See Model Number Table & Power Derating Curve				mA	
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	5V <sub>o</sub>				6.2	V <sub>dc</sub>
		12V <sub>o</sub>				15	
		15V <sub>o</sub>				18	
		±5V <sub>o</sub>				±6.2	
		±12V <sub>o</sub>				±15	
		±15V <sub>o</sub>				±18	

### EFFICIENCY

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
100% Load	V <sub>in</sub> =72V	See Model Number Table				%



# EC7AW18-ECRT/EDRT Series

## 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 $di/dt=0.1A/us$ (within 1% $V_{out}$ nominal)	All				±5	%
Recovery Time			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				30	ms
Turn-On Delay Time, From Input	$V_{in\_min}$ to 10% $V_{o\_set}$ , Power up	All				30	ms
Output Voltage Rise Time	10% $V_{o\_set}$ to 90% $V_{o\_set}$	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	$V_{ac}$
	1 Minute; Input to case					2000	$V_{ac}$
	1 Minute; Output to case					1000	$V_{ac}$
Isolation Resistance	Input to output	All	1000			MΩ	
Isolation Capacitance	Input to output	All				2000	pF
	Input to case					780	
	Output to case					1120	

## FEATURE CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units	
Switching Frequency	Pulse wide modulation (PWM), Fixed	All	230	255	280	KHz	
On/Off Control, Remote On/Off Logic, Refer to -Vin pin							
Logic High (Module Off)	$V_{on/off}$ at $I_{on/off}>0.3mA$	All	3.5			12	V
Logic Low (Module On)	$V_{on/off}$ at $I_{on/off}=0.0uA$ , Pin open=on	All	0			1.2	V
On/Off Current (for both remote on/off logic)	$I_{on/off}$ at $V_{on/off}=3.5-12V$	All	0.3			2.4	mA
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°C	72S05				831	K hours
		72S12				982	
		72S15				1000	
		72D05				797	
		72D12				902	
		72D15				970	
Weight		-ECRT				103	grams
		-EDRT				118	
Case plate Material	Aluminum						
Potting Material	UL 94V-0 (DC Module)						
Shock/Vibration	EN50155 (EN61373) Compliant						
Humidity	95% RH max. Non Condensing						
Altitude	5000m Operating Altitude, 12000m Transport Altitude						
Thermal Shock	MIL-STD-810F						



# EC7AW18-ECRT/EDRT Series

## GENERAL SPECIFICATIONS

Fire & Smoke	EN45545-2 Compliant	
EMI	EN55032 & EN50155 Compliant	Class A
ESD	EN61000-4-2 Level 3: Air $\pm 8kV$ , Contact $\pm 6kV$	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, $\pm 2kV$ (EN50155) Level 3: On power input port, $\pm 2kV$ (EN55035)	Perf. Criteria A
Surge	EN61000-4-5 Level 4: Line to earth, $\pm 4kV$ , Line to line, $\pm 2kV$ (EN50155) Level 3: Line to earth, $\pm 2kV$ , Line to line, $\pm 1kV$ (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="#">EC7AW18-72S EC(D)RT 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 $m/s^2$ Transverse: 0.450 $m/s^2$ Longitudinal: 0.700 $m/s^2$ 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 $m/s^2$ Transverse: 2.55 $m/s^2$ Longitudinal: 3.96 $m/s^2$ 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 $m/s^2$ +/-Transverse: 30 $m/s^2$ +/-Longitudinal: 50 $m/s^2$ Duration: 30ms x18 (Each axis 3 shocks)	Pass



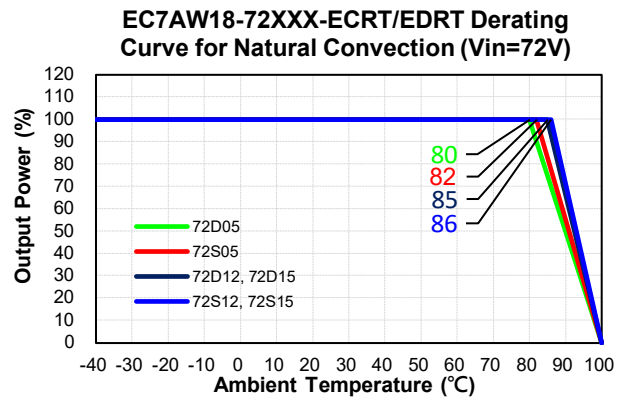
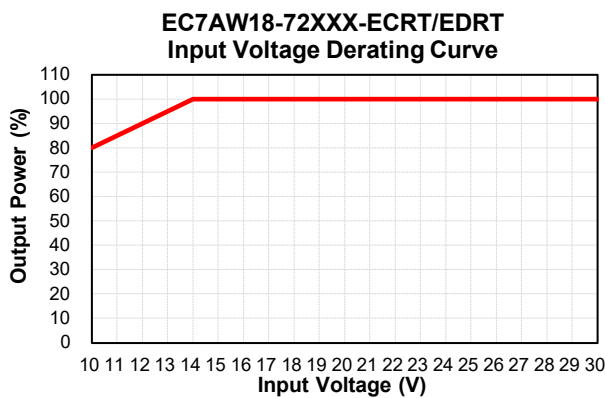
# EC7AW18-ECRT/EDRT Series

## EN45545-2 Fire & Smoke Test Conditions.

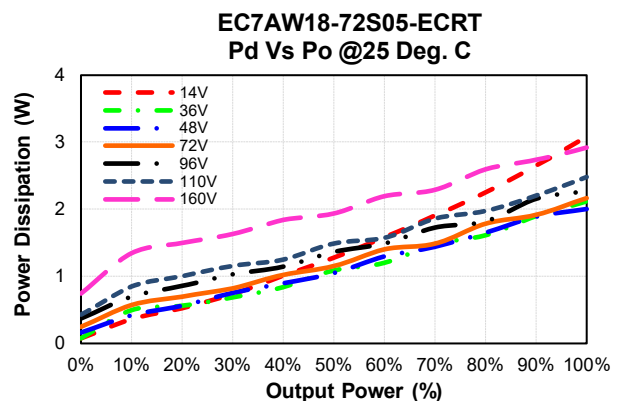
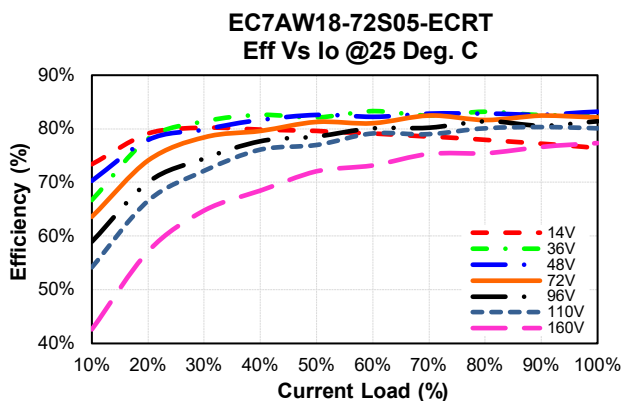
Item		Standard	Hazard Level
R22	Oxygen Index Test	EN 45545-2: 2013 EN ISO 4589-2: 2006	HL1, HL2, HL3
	Smoke Density Test	EN 45545-2: 2013 EN ISO 5659-2: 2013	HL1, HL2, HL3
	Smoke Toxicity Test	EN 45545-2: 2013 NF X70-100: 2006	HL1, HL2, HL3
R23	Oxygen Index Test	EN 45545-2: 2013 EN ISO 4589-2: 2006	HL1, 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



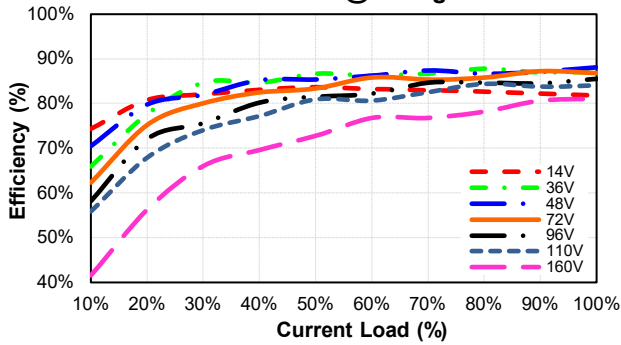
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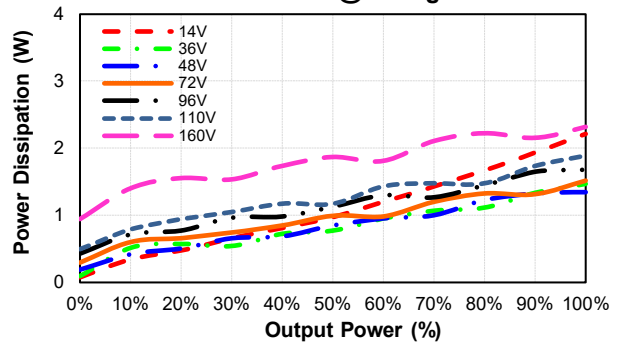


# EC7AW18-ECRT/EDRT Series

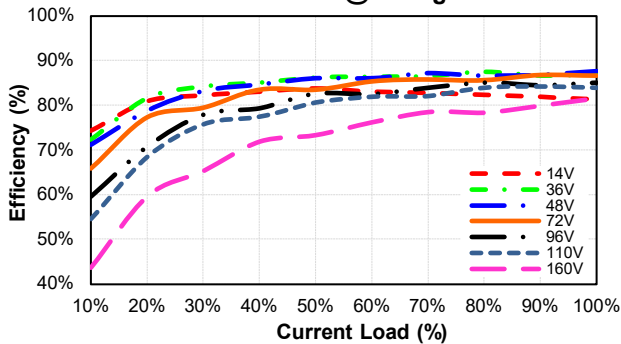
**EC7AW18-72S12-ECRT**  
Eff Vs Io @25 Deg. C



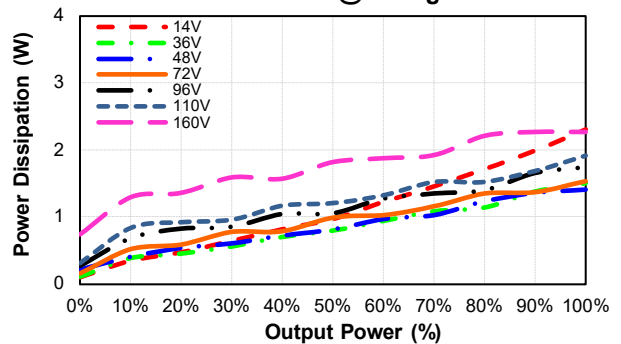
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Pd Vs Po @25 Deg. C



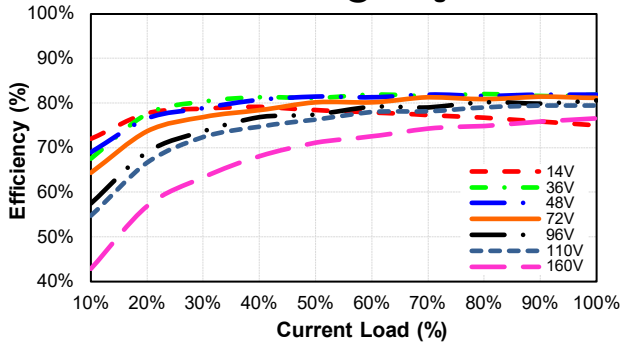
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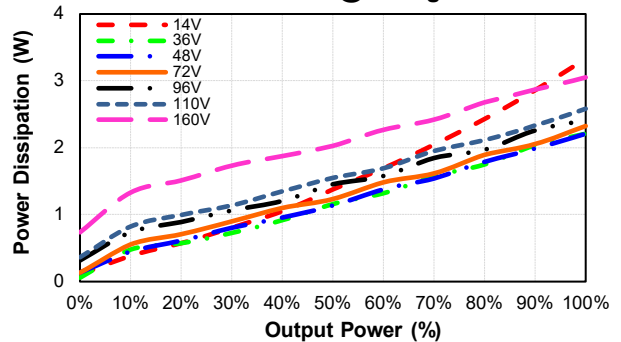
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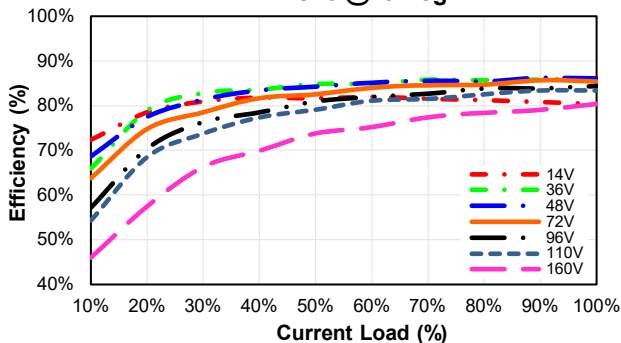
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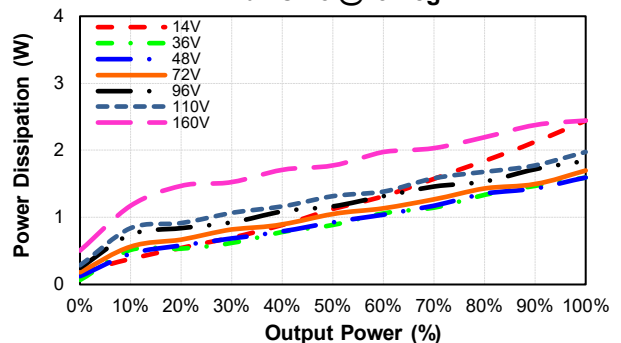
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Pd Vs Po @25 Deg. C



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



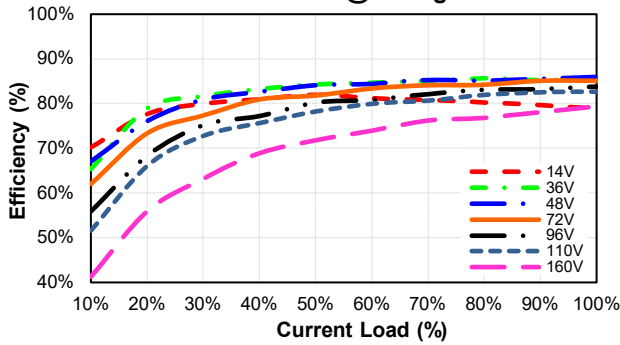
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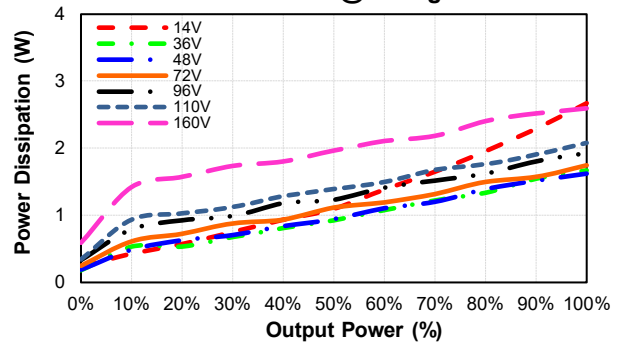


# EC7AW18-ECRT/EDRT Series

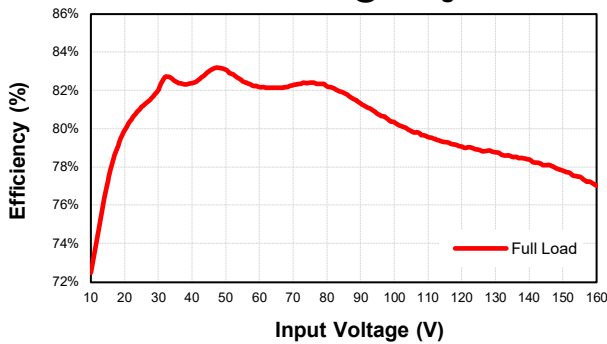
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Eff Vs Io @25 Deg. C



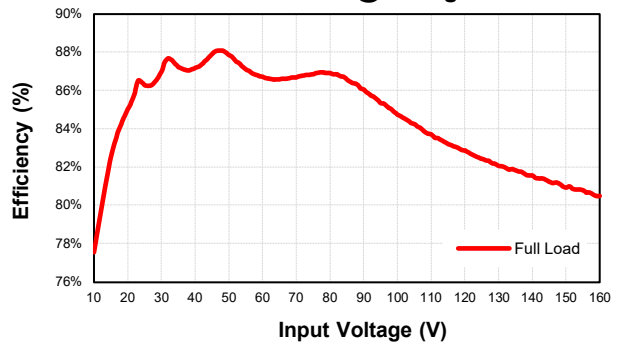
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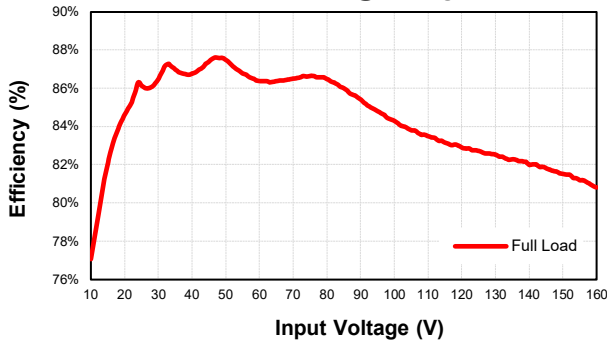
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Eff Vs Vin @25 Deg. C



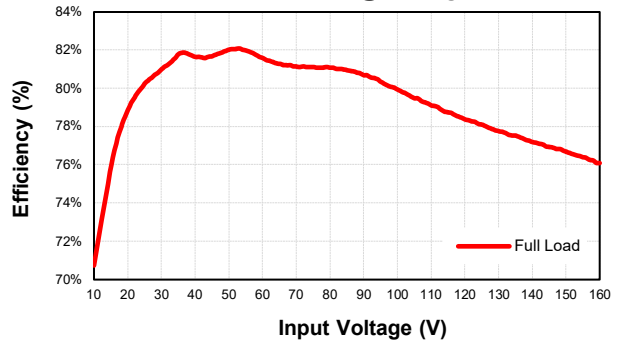
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Eff Vs Vin @25 Deg. C



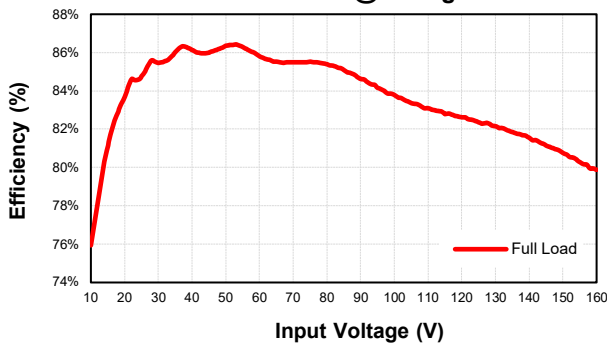
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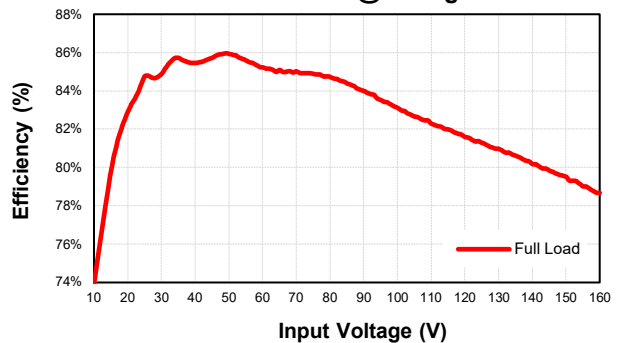
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Eff Vs Vin @25 Deg. C



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Eff Vs Vin @25 Deg. C



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

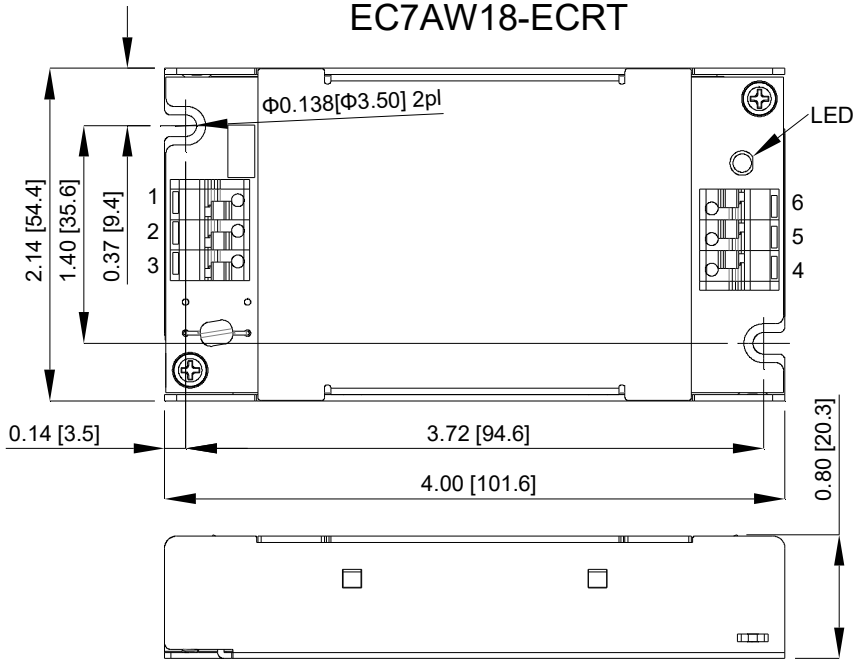




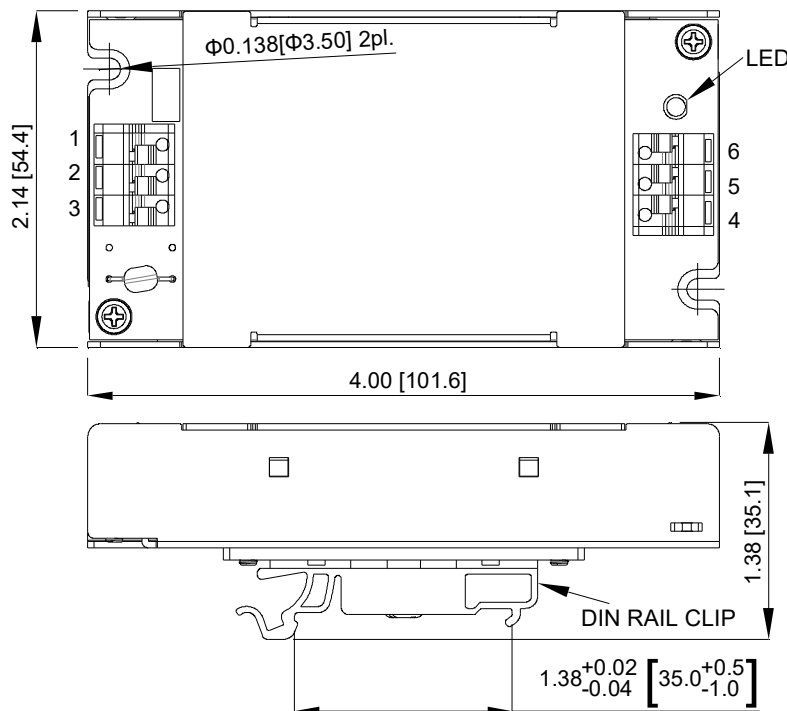
# EC7AW18-ECRT/EDRT Series

## MECHANICAL SPECIFICATION

### EC7AW18-ECRT



### EC7AW18-EDRT



PIN CONNECTION		
PIN	Single	Dual
1	+V Input	+V Input
2	-V Input	-V Input
3	Remote	Remote
4	NA	-V Output
5	-V Output	Common
6	+V Output	+V Output

All Dimensions in Inches[mm]  
 Millimeters: X.X= ±0.5 , X.XX=±0.25  
 Tolerance Inches: X.XX=±0.02 , X.XXX= ±0.010

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