

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 3rd (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 0.2~1.5mm²).
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 _{dc}
Input Surge Voltage	100ms max.	All			200	V _{dc}
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 _{dc}	
Input Under Voltage Lockout							
Turn-On Voltage Threshold	80% Load	All	8.5	9.1	9.8	V _{dc}	
Turn-Off Voltage Threshold	80% Load	All	7.9	8.4	9.0	V _{dc}	
Lockout Hysteresis Voltage	80% Load	All		0.7		V _{dc}	
Maximum Input Current	V _{in} =14V, Full load	All		1.0		A	
Maximum Input Inrush Current	V _{in} =160V, Full load	All			15	A	
No-Load Input Current	V _{in} =72V, I _o =0A	See Model Number Table					mA

OUTPUT CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units	
Voltage Set Point Accuracy	V _{in} =72V, Full load, T _c =25°C	All	-1.2		+1.0	%	
Output Voltage Balance	V _{in} =72V, Full load, T _c =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 _{in} =High line to low line, full load	All			±0.2	%	
Cross Regulation	Load cross variation 25%/100%	Dual			±5.0	%	
Temperature Coefficient	T _c =-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 _{in} = 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	5Vo				6.2	V _{dc}
		12Vo				15	
		15Vo				18	
		±5Vo				±6.2	
		±12Vo				±15	
		±15Vo				±18	

EFFICIENCY

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
100% Load	V _{in} =72V	See Model Number Table				%



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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					



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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	EC7AW18-72S EC(D)RT Series App Notes	
Packaging Information Link	Packaging Information	

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: $-40^{\circ}C$ Duration: 2 hrs	Pass
Dry Heat Test	13.4.5	EN 60068-2-2	Class OT4 & Cycle B Temperature: $70^{\circ}C$ Duration: 6 hrs Extended temperature: $85^{\circ}C$ Extended Duration: 10min	Pass
Low Temperature Storage Test	13.4.6	EN 60068-2-1	Temperature: $-40^{\circ}C$ Duration: 16 hrs	Pass
Cyclic Damp Heat Test	13.4.7	EN 60068-2-30	Temperature: $25^{\circ}C - 55^{\circ}C$ Humidity: 90% RH Duration: 48 hrs	Pass
Random Vibration Test	13.4.11	EN 61373	Temperature: $25^{\circ}C \pm 10^{\circ}C$ Humidity: 50% $\pm 25\%$ 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: $25^{\circ}C \pm 10^{\circ}C$ Humidity: 50% $\pm 25\%$ 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: $25^{\circ}C \pm 10^{\circ}C$ Humidity: 50% $\pm 25\%$ RH Frequency range: 5 ~ 150 Hz \pm -Vertical: $30 m/s^2$ \pm -Transverse: $30 m/s^2$ \pm -Longitudinal: $50 m/s^2$ Duration: 30ms x18 (Each axis 3 shocks)	Pass



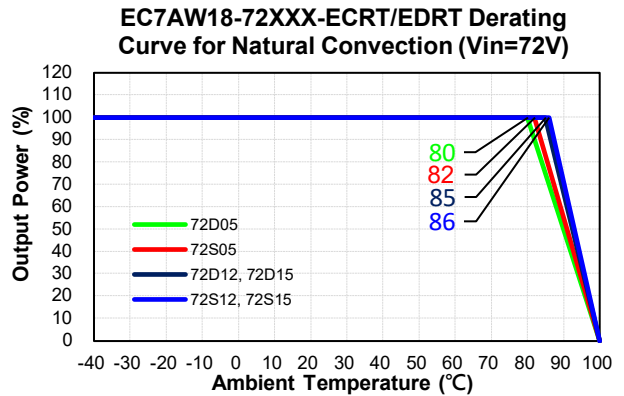
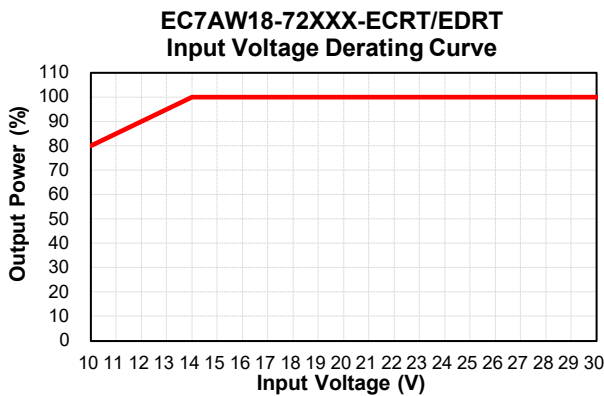
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EN45545-2 Fire & Smoke Test Conditions.

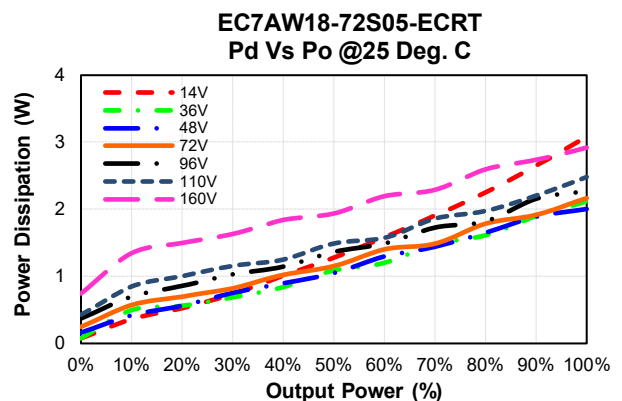
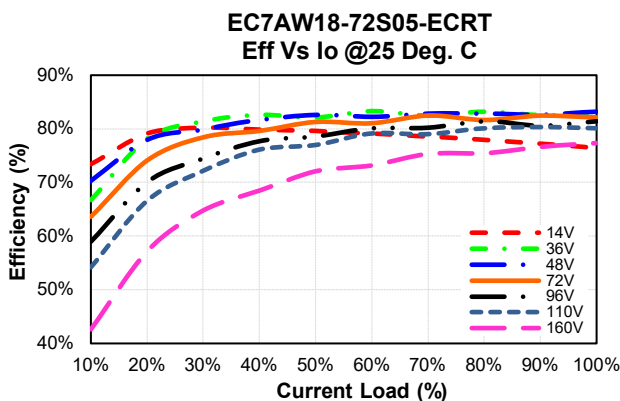
Item		Standard	Hazard Level
R22	Oxygen Index Test	EN 45545-2: 2013 EN ISO 4589-2: 2006	HL1, HL2, HL3
	Smoke Density Test	EN 45545-2: 2013 EN ISO 5659-2: 2013	HL1, HL2, HL3
	Smoke Toxicity Test	EN 45545-2: 2013 NF X70-100: 2006	HL1, HL2, HL3
R23	Oxygen Index Test	EN 45545-2: 2013 EN ISO 4589-2: 2006	HL1,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



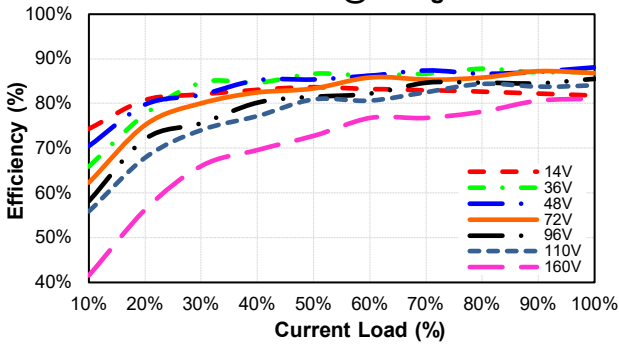
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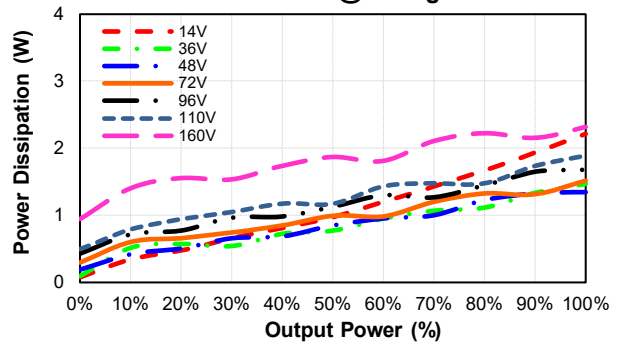


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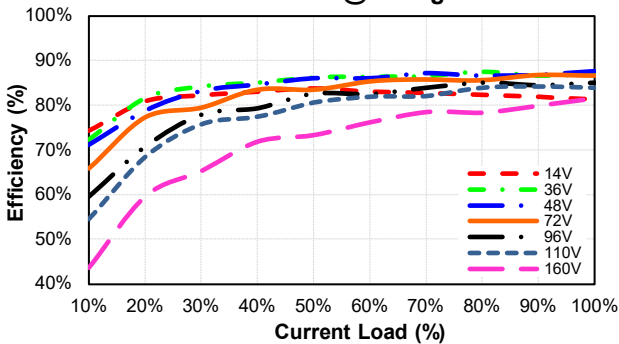
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Eff Vs Io @25 Deg. C



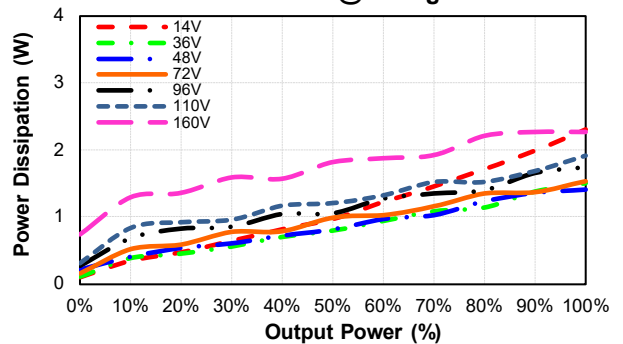
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Pd Vs Po @25 Deg. C



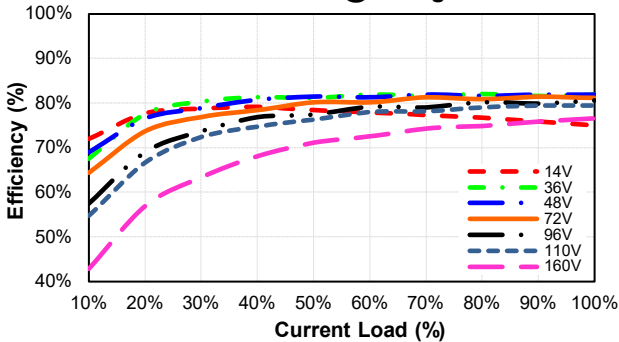
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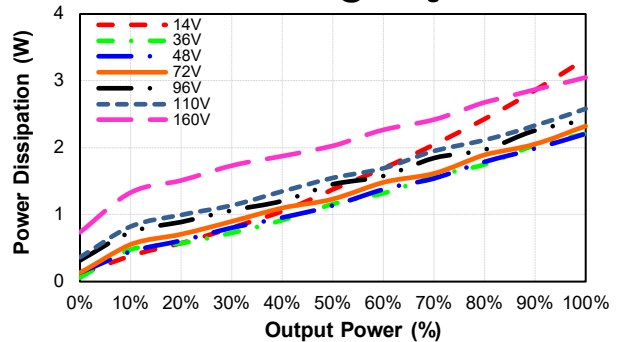
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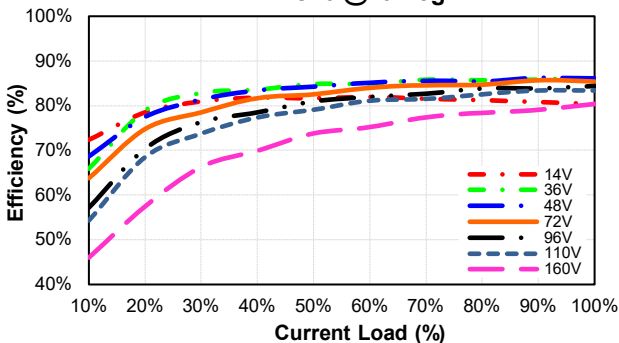
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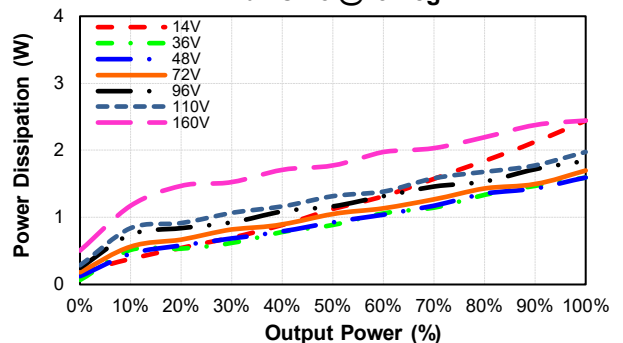
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EC7AW18-72D12-ECRT
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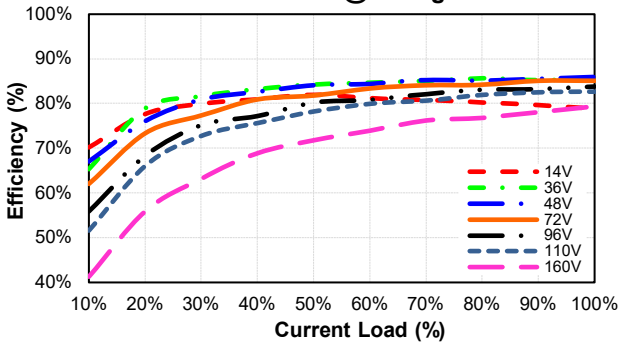
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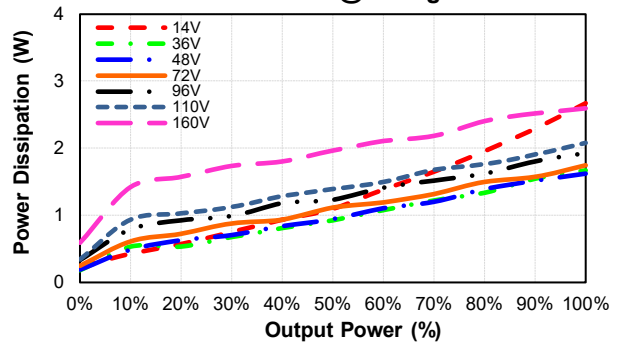


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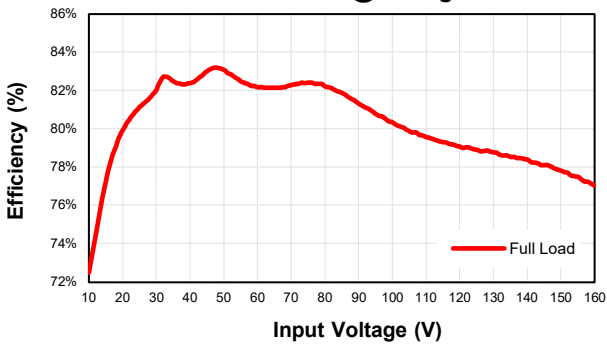
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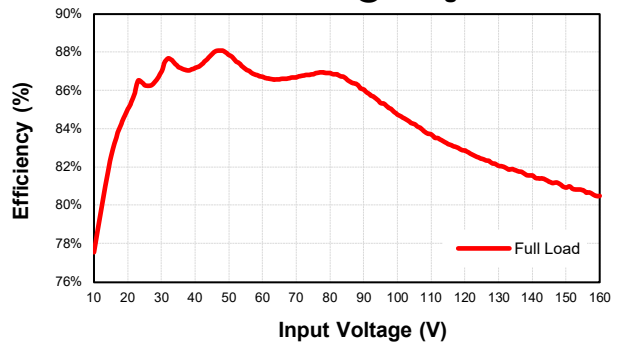
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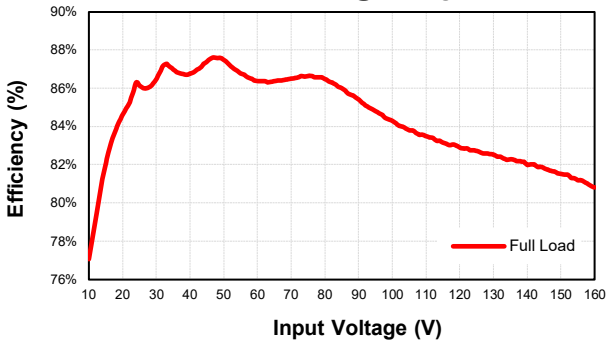
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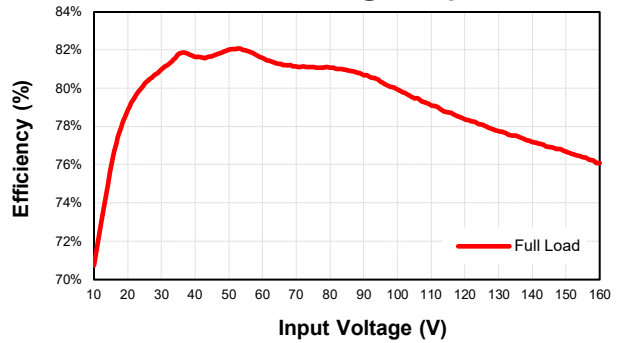
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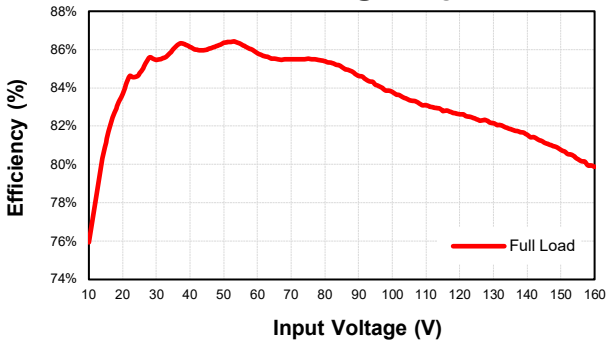
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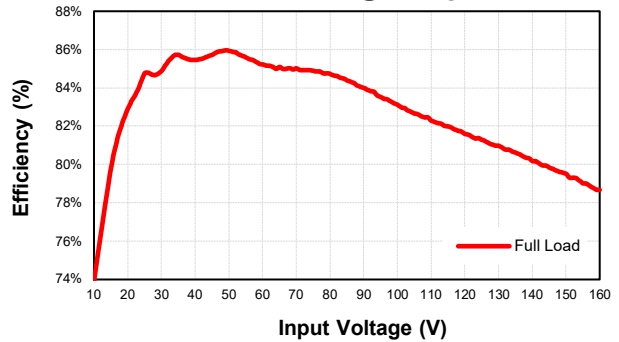
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Eff Vs Vin @25 Deg. C



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Eff Vs Vin @25 Deg. C



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

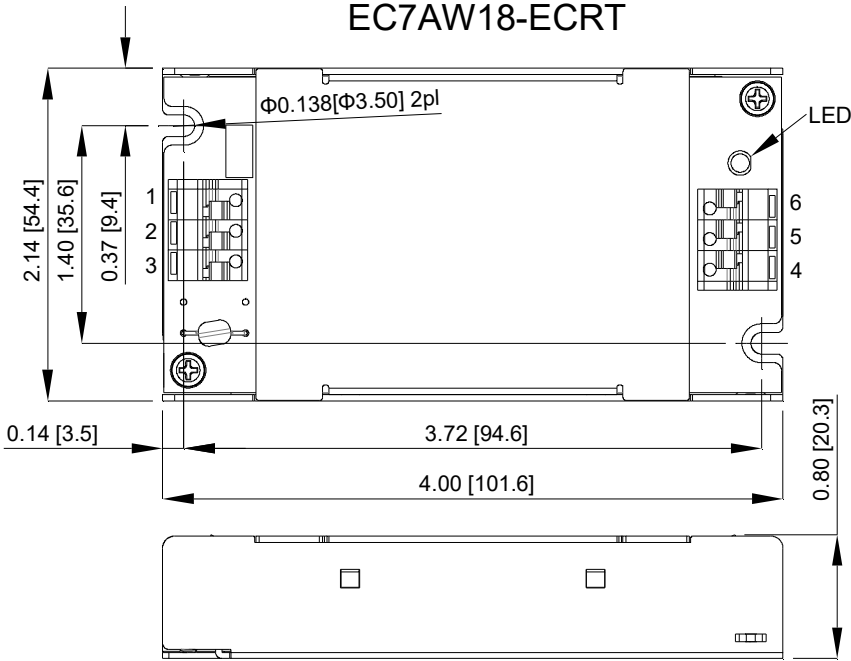




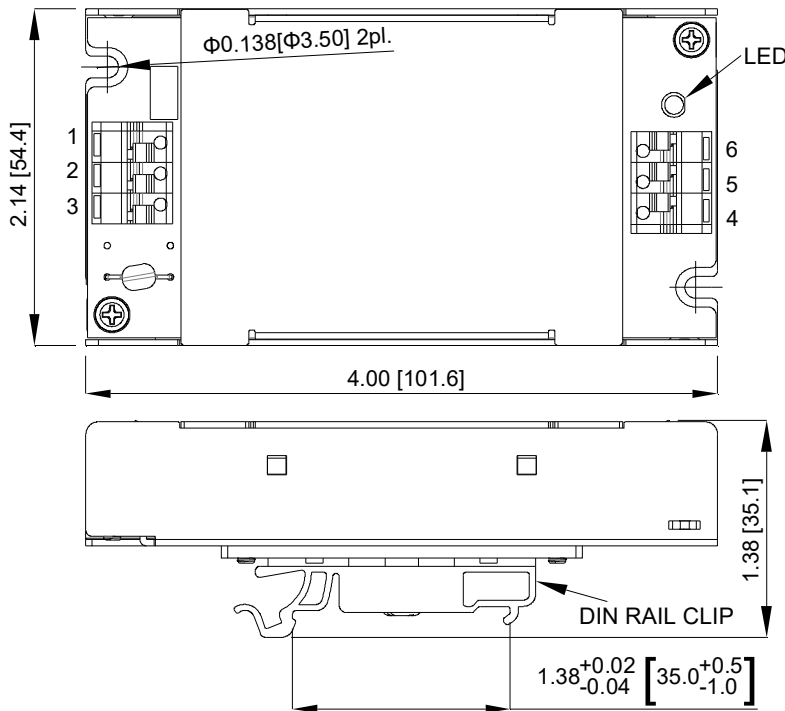
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MECHANICAL SPECIFICATION

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