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℃
- 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



Railway System

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^2).
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	-ZZZZ	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

TECHNICAL SPECIFICATIONS

(All specifications are typical at nominal input, full load at 25℃ 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	℃
Storage Temperature		All	-40		105	℃

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, Io=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, Tc=25℃	All	-1.2		+1.0	%
Output Voltage Balance	V_{in}=72V, Full load, Tc=25℃	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℃ to 100℃	All			±0.02	%/℃
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	Vin=72V	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 d_i/d_t=0.1A/us (within 1% Vout 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)	Ion/off at Von/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℃	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					

GENERAL SPECIFICATIONS

Fire & Smoke	EN45545-2 Compliant		
EMI	EN55032 & EN50155 Compliant		Class A
ESD	EN61000-4-2	Level 3: Air ±8kV, Contact ±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, ±2kV (EN50155) Level 3: On power input port, ±2kV (EN55035)	Perf. Criteria A
Surge	EN61000-4-5	Level 4: Line to earth, ±4kV, Line to line, ±2kV (EN50155) Level 3: Line to earth, ±2kV, Line to line, ±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.

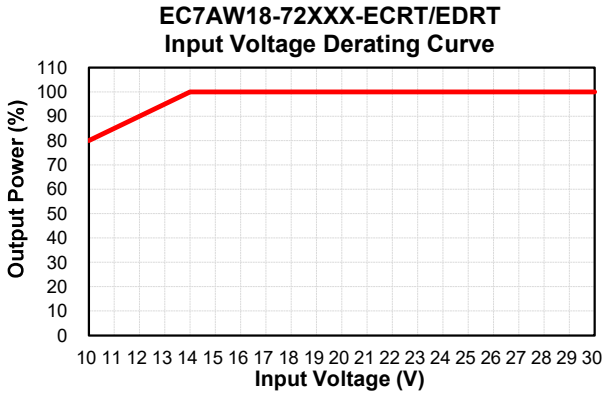
Phenomenon	EN50155; 2017 Reference Clause(s)	Reference Standard	Test Conditions	Result
Low Temperature Start-up test	13.4.4	EN 60068-2-1	Class OT4 Temperature: -40℃ Duration: 2 hrs	Pass
Dry Heat Test	13.4.5	EN 60068-2-2	Class OT4 & Cycle B Temperature: 70℃ Duration: 6 hrs Extended temperature: 85℃ Extended Duration: 10min	Pass
Low Temperature Storage Test	13.4.6	EN 60068-2-1	Temperature: -40℃ Duration: 16 hrs	Pass
Cyclic Damp Heat Test	13.4.7	EN 60068-2-30	Temperature: 25℃ - 55℃ Humidity: 90% RH Duration: 48 hrs	Pass
Random Vibration Test	13.4.11	EN 61373	Temperature: 25℃ +/- 10℃ 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℃ +/-10℃ 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℃ +/-10℃ 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

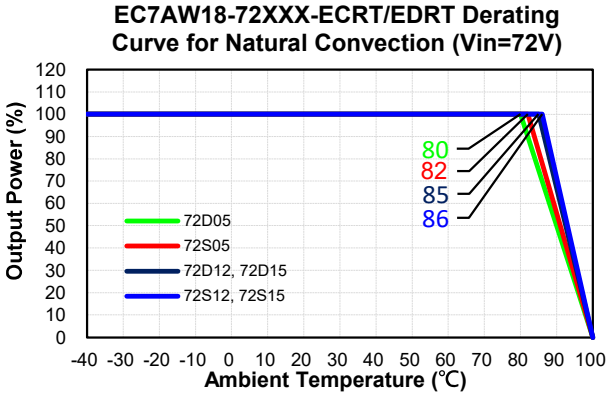
EN45545-2 Fire & Smoke Test Conditions.

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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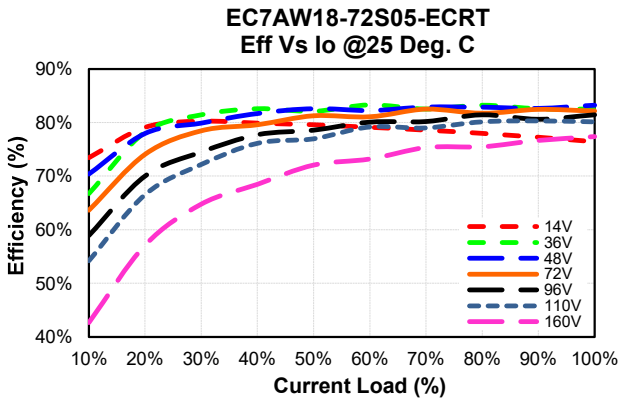
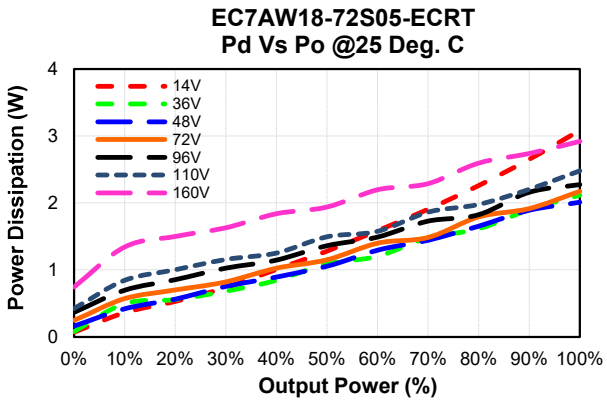
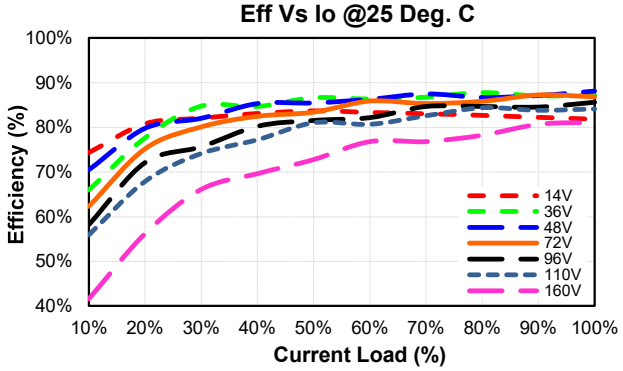




EC7AW18-72S12-ECRT
Eff Vs Io @25 Deg. C



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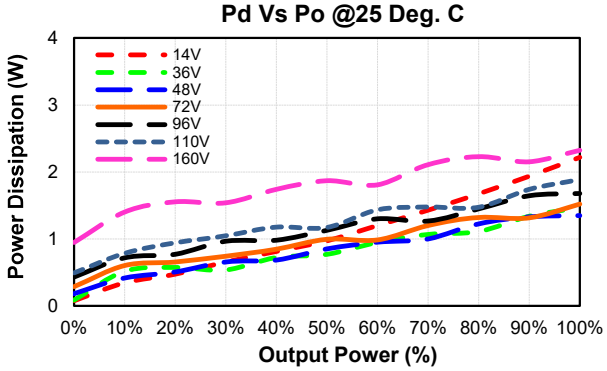
Pd Vs Po @25 Deg. C



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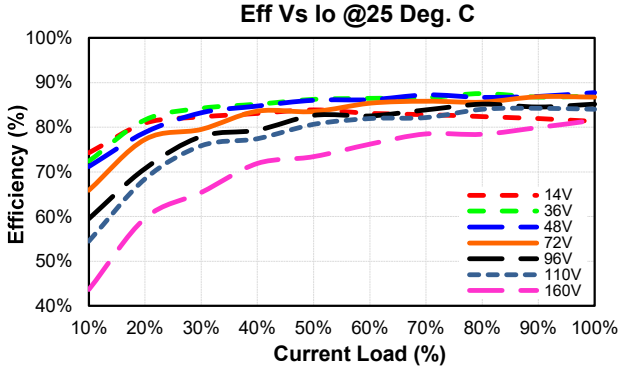

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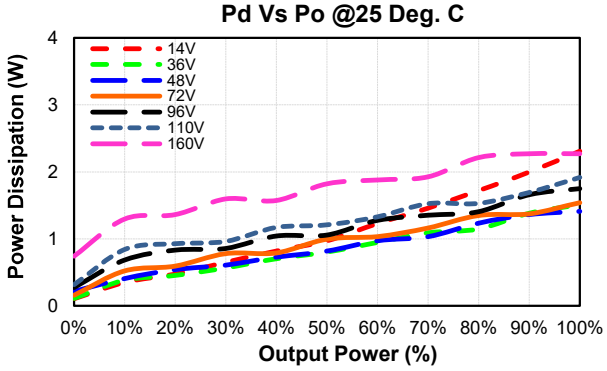

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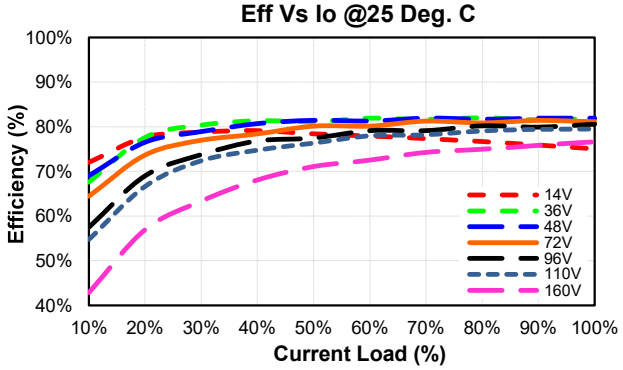

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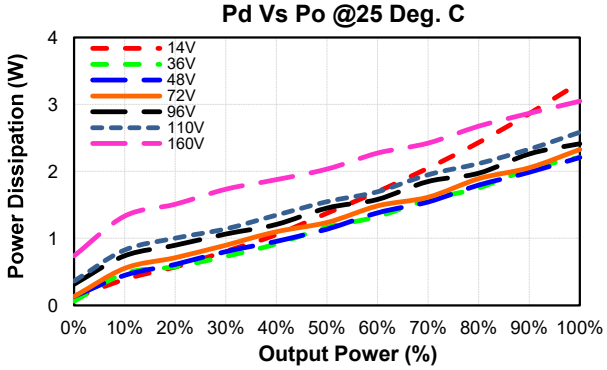

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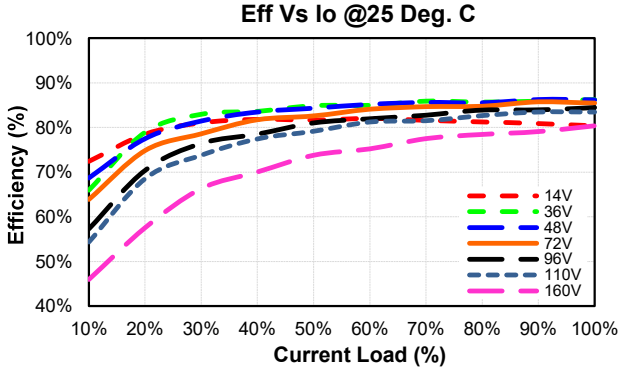

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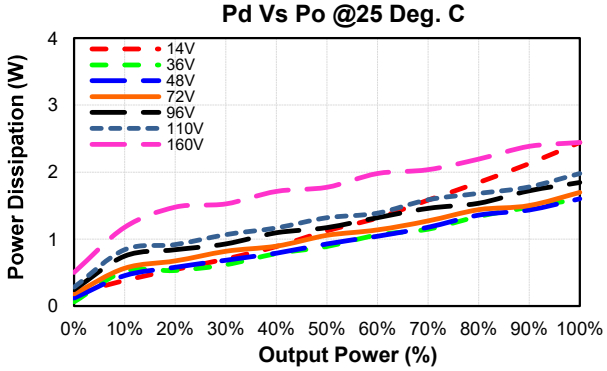

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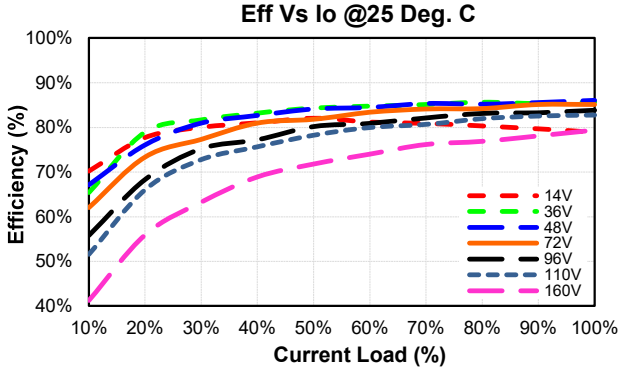

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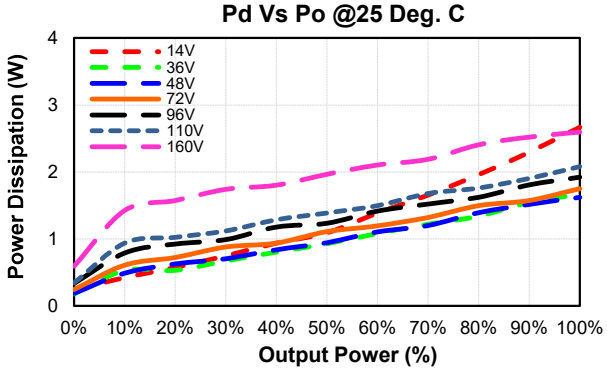

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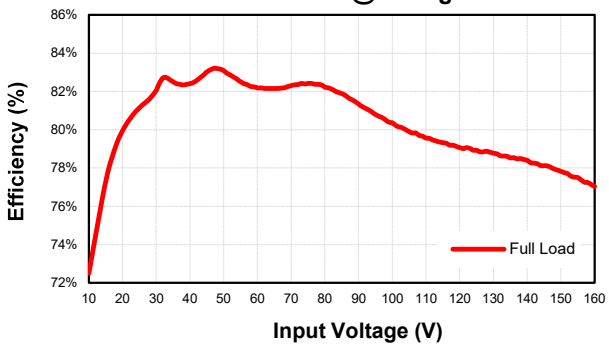

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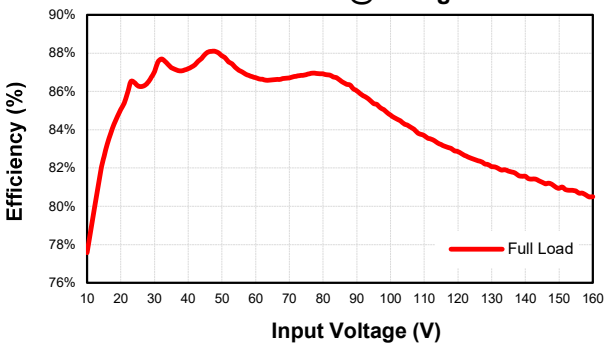

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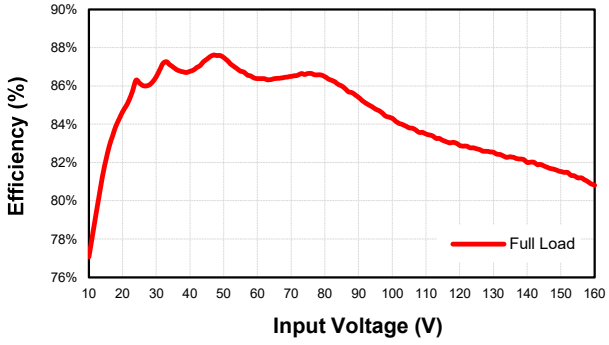

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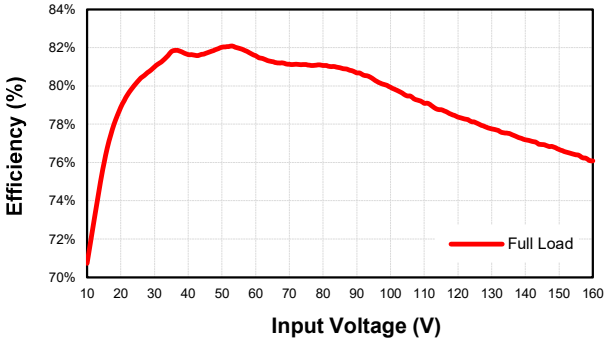

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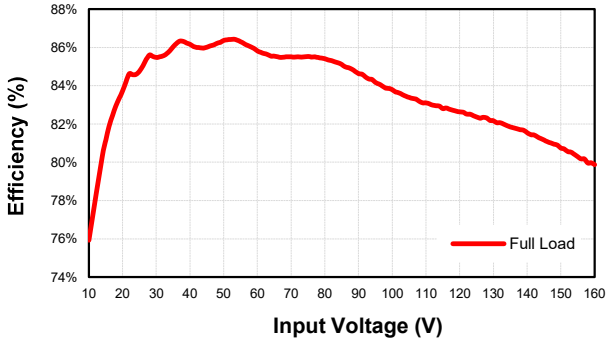

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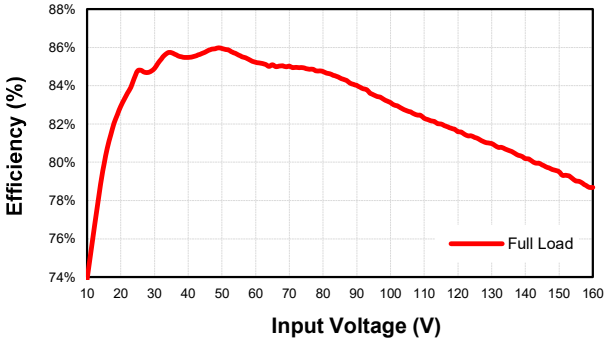
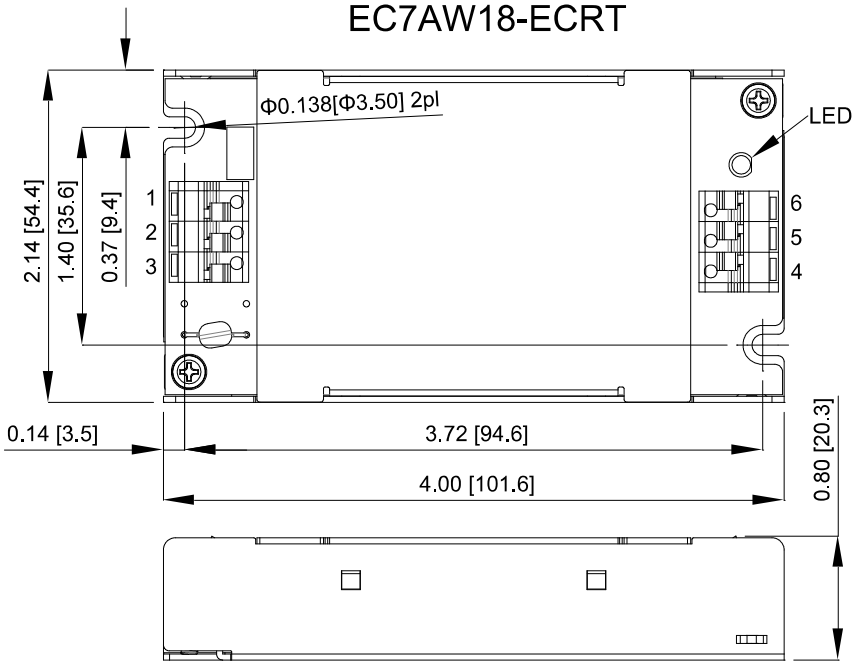


MECHANICAL SPECIFICATION

EC7AW18-ECRT



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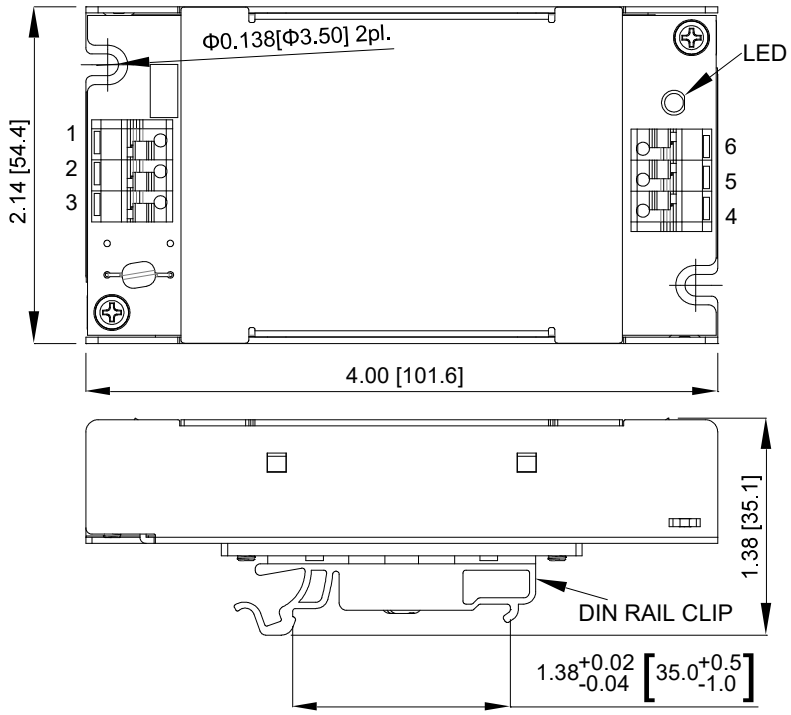

PIN CONNECTION		
PIN	Single	Dual
1	+V Input	+V Input
2	-V Input	-V Input
3	Remote	Remote
4	NA	-V Output
5	-V Output	Common
6	+V Output	+V Output

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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