



EC7BW18 ECRT/EDRT SERIES 20 WATT 16:1 INPUT ISOLATED DC-DC CONVERTERS

Features

- Efficiency Up to 88%
- Fixed Switching Frequency
- Regulated Outputs
- Negative Logic Remote On/Off
- Low No Load Power Consumption
- Fully protected (OTP/OCP/OVP/UVLO)
- 3000Vac I/O Isolation
- Operating Case Temperature -40 to +100°C
- UL 62368-1 2nd (Reinforced Insulation) Approval for DC Modules
- Compliant with EN 55032, EN55035, EN 50155, EN 50121-3-2, EN 45545-2
- Safety Meets IEC/EN/UL 62368-1
- Chassis Mount, Baseplate Cooled
- Low Inrush Current
- Input Reverse Polarity Protection
- EN 50155 Class S3/Class C2 Criteria A without External Capacitor
- Output LED Indicator
- 4.45"x2.33"x0.85" Size



MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT		INPUT CURRENT		% EFF.	CAPACITOR LOAD MAX.
			MIN.	MAX.	NO LOAD	FULL LOAD		
EC7BW18-72S05-ZZZZW	10-160 VDC	5 VDC	0 mA	4000 mA	8 mA	330 mA	84	6800uF
EC7BW18-72S12-ZZZZW	10-160 VDC	12 VDC	0 mA	1670 mA	10 mA	320 mA	87	3300uF
EC7BW18-72S15-ZZZZW	10-160 VDC	15 VDC	0 mA	1330 mA	10 mA	316 mA	88	2200µF
EC7BW18-72D12-ZZZZW	10-160 VDC	±12 VDC	0 mA	±833 mA	10 mA	320 mA	87	820µF
EC7BW18-72D15-ZZZZW	10-160 VDC	±15 VDC	0 mA	±667 mA	10 mA	316 mA	88	680µF
EC7BW18-72D24-ZZZZW	10-160 VDC	±24 VDC	0 mA	±417 mA	10 mA	316 mA	88	330µF

NOTE:

1. Nominal Input Voltage 72 VDC.
2. VR1 is Used for Output Voltage Adjustment (Single Output Only).
3. Refer to Application Note for Thermal Resistance and Derating Information.
4. TVS is Included for Input Surge Voltage Protection.
5. Fuse & Shunt Diode is Include Inside for Input Reverse Polarity Protection.
6. CN1 & CN2 connection: DINKLE 0137-1103 Series or Equivalent, Suitable Electric Wire: 26~16AWG (IEC 0.2~1.5mm²).
7. EC7BW18-72XYZ-ZZZZW has De-rating by Input Voltage is Required See Power Derating Curve.
8. EDRT & 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
EC7BW18-	II	O	XX	-ZZZZ	W
EC7BW18	72: 72 VDC	S: Single D: Dual	05: 5VDC 12: 12VDC 15: 15VDC 24: 24VDC	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:

EC7BW18-72S12-EDRTP: Enclosed Chassis Mount + Din Rail, 20W, 16:1 10-160Vdc Input, Single 12Vdc Output, With Protective Coating



EC7BW18-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	70% Load	All	8.5	9.2	9.9	V _{dc}	
Turn-Off Voltage Threshold	70% Load	All	8.1	8.7	9.1	V _{dc}	
Lockout Hysteresis Voltage	70% Load	All		0.5		V _{dc}	
Maximum Input Current	V _{in} =14V, Full load	All		2.0		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 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		All			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
Output Voltage Trim Range	P _o ≤ max. rated power, I _o ≤ I _{o,max.}	72S05	-20		+15	%
		72S12	See Power Derating Curve			
		72S15	See Power Derating Curve			
Over Voltage Protection	Zener clamp	5V _o		6.2		V _{dc}
		12V _o		15		
		15V _o		18		
		±12V _o		±15		
		±15V _o		±18		
		±24V _o		±30		

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		All			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}	5Vo		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_{ac}
	1 Minute; Input to case				2000	V_{ac}
	1 Minute; Output to case				500	V_{ac}
Isolation Resistance	Input to output	All	1000			MΩ
Isolation Capacitance	Input to output	All		2400		pF
	Input to case			2400		
	Output to case			1900		

FEATURE CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Switching Frequency	Pulse width modulation (PWM), Fixed	All	180	200	220	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
Over Temperature Shutdown	Temperature at the center part of case plate, non-latching	All		106		°C
Over Temperature Recovery		All		92		°C

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		462		K hours
		72S12		481		
		72S15		527		
		72D12		518		
		72D15		549		
		72D24		523		
Weight		-ECRT		129		grams
		-EDRT		144		
		-ECRTP		135		
		-EDRTP		150		
Case plate Material	Aluminum					
Potting Material	UL 94V-0 (DC Module)					
Shock/Vibration	EN 50155 (EN 61373) 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	EN 45545-2 Compliant	
EMI	EN 55032 & EN 50155 Compliant	Class A
ESD	EN 61000-4-2	Level 3: Air $\pm 8\text{kV}$, Contact $\pm 6\text{kV}$
Radiated Immunity	EN 61000-4-3	Level 3: 80~1000MHz, 20V/m
Fast Transient	EN 61000-4-4	Level 3: On power input port, $\pm 2\text{kV}$ (EN 50155) Level 4: On power input port, $\pm 4\text{kV}$ (EN 55035)
Surge	EN 61000-4-5	Level 4: Line to earth, $\pm 4\text{kV}$, Line to line, $\pm 2\text{kV}$ (EN 50155) Level 3: Line to earth, $\pm 2\text{kV}$, Line to line, $\pm 1\text{kV}$ (EN 55035) Level 4: Line to earth, $\pm 4\text{kV}$, Line to line, $\pm 2\text{kV}$, with external input capacitor 120uF/220V KXJ series (EN 55035)
Conducted Immunity	EN 61000-4-6	Level 3: 0.15~80MHz, 10V
Interruptions of Voltage Supply	EN 50155	Class S3: 20ms interruptions
Supply Change Over	EN 50155	Class C2: During a supply break of 30 ms
Application Note Link		EC7BW18 ECRT/EDRT Series App Notes
Packaging Information Link		Packaging Information

Immunity to Environmental Conditions.

Phenomenon	EN 50155; 2021 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: $25^{\circ}\text{C} - 55^{\circ}\text{C}$ 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 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: $25^{\circ}\text{C} \pm 10^{\circ}\text{C}$ 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: $25^{\circ}\text{C} \pm 10^{\circ}\text{C}$ 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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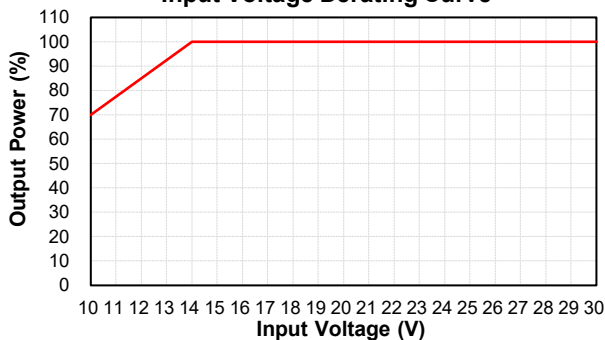
EN 45545-2 Fire & Smoke Test Conditions.

Item		Standard	Hazard Level
R22	Oxygen Index Test	EN 45545-2: 2020 EN ISO 4589-2:2017	HL1, HL2, HL3
	Smoke Density Test	EN 45545-2: 2020 EN ISO 5659-2:2017	HL1, HL2, HL3
	Smoke Toxicity Test	EN 45545-2: 2020 EN 17084:2018	HL1, HL2, HL3
R23	Oxygen Index Test	EN 45545-2: 2020 EN ISO 4589-2:2017	HL1, HL2, HL3
	Smoke Density Test	EN 45545-2: 2020 EN ISO 5659-2:2017	HL1, HL2, HL3
	Smoke Toxicity Test	EN 45545-2: 2020 EN 17084:2018	HL1, HL2, HL3
R24	Oxygen Index Test	EN 45545-2: 2013 EN ISO 4589-2	HL1, HL2, HL3
R25	Glow - Wire Test	EN 45545-2:2013+A1:2016 EN 60695-2-11:2014	HL1, HL2, HL3
R26	Vertical Flame Test	EN 45545-2: 2013+A1:2015 EN 60695-11-10: 2013	HL1, HL2, HL3

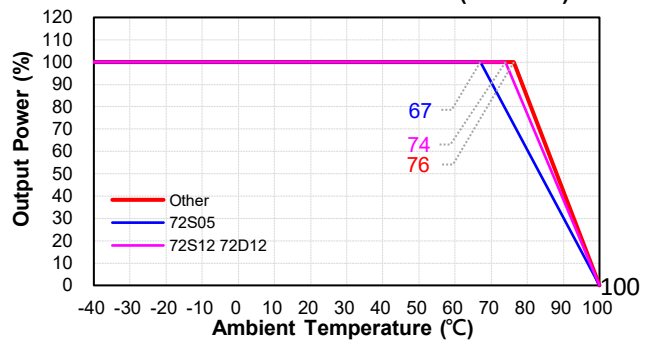
CHARACTERISTIC CURVE

Power Derating Curve

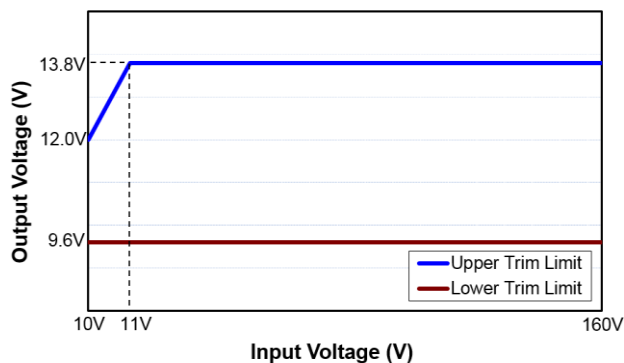
EC7BW18-72XXX-ECRT/EDRT
Input Voltage Derating Curve



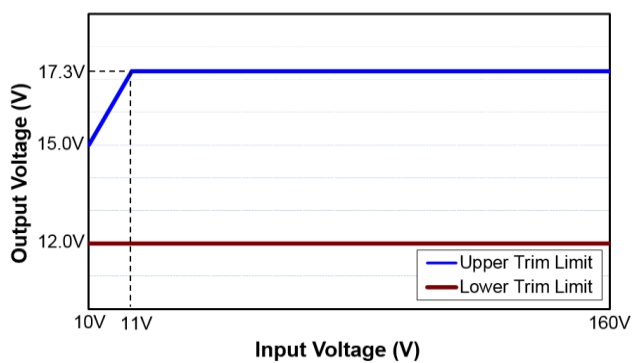
EC7BW18-72XXX-ECRT/EDRT Derating
Curve for Natural Convection (Vin=72V)



EC7BW18-72S12-ECRT/EDRT Trim Curve



EC7BW18-72S15-ECRT/EDRT Trim Curve

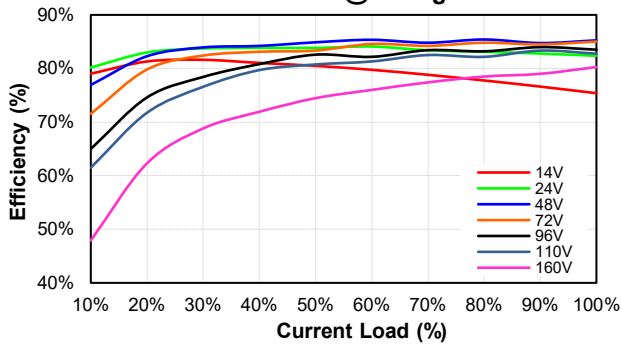




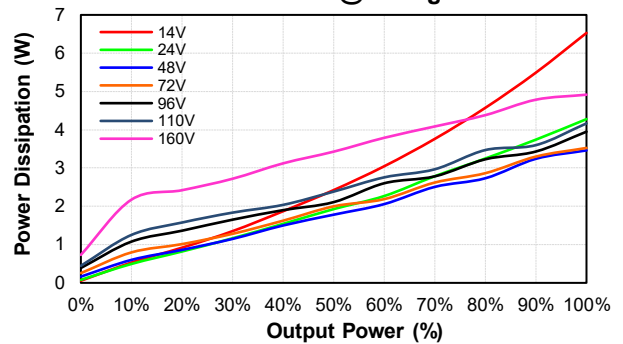
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Performance Data

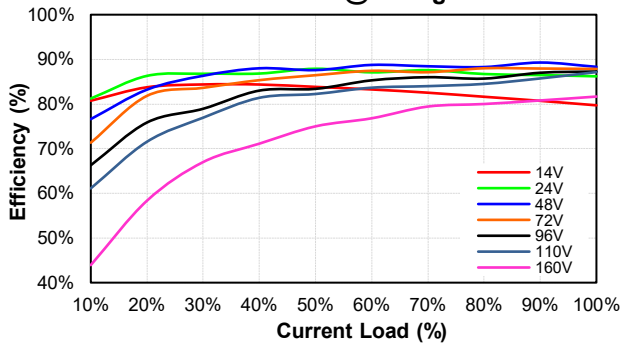
EC7BW18-72S05-ECRT
Eff Vs Io @25 Deg. C



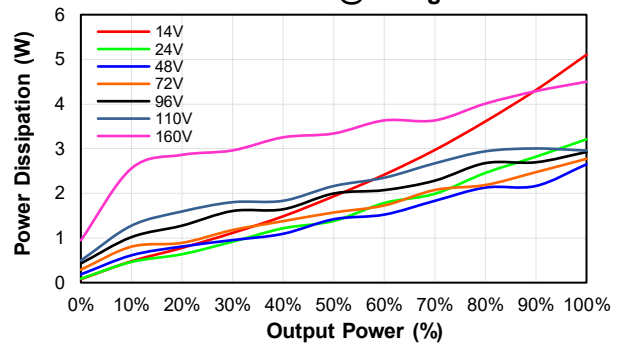
EC7BW18-72S05-ECRT
Pd Vs Po @25 Deg. C



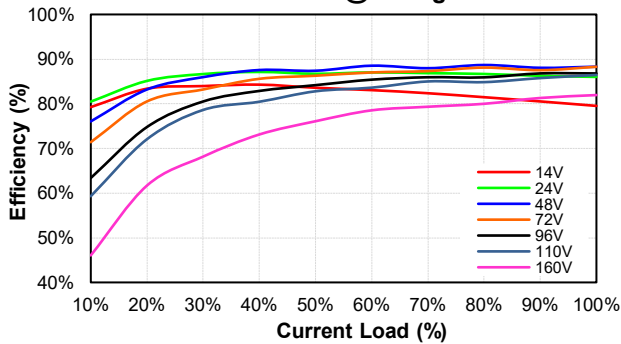
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Eff Vs Io @25 Deg. C



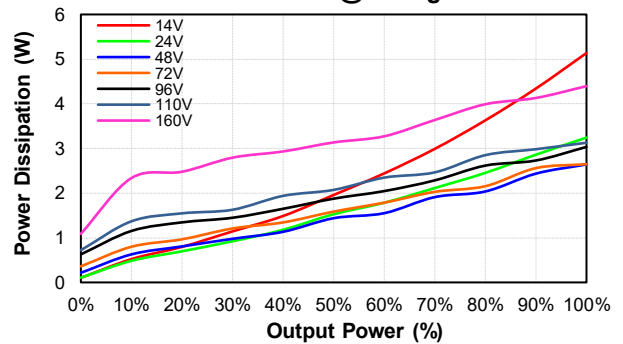
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Pd Vs Po @25 Deg. C



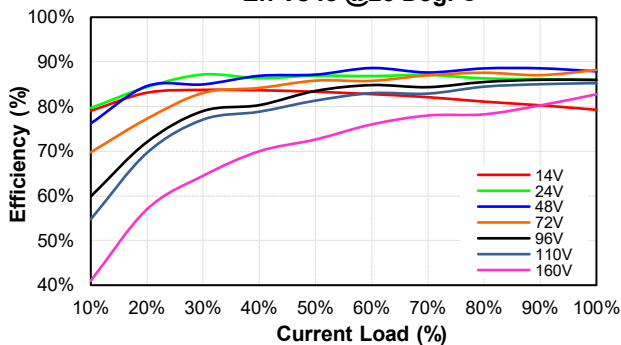
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Eff Vs Io @25 Deg. C



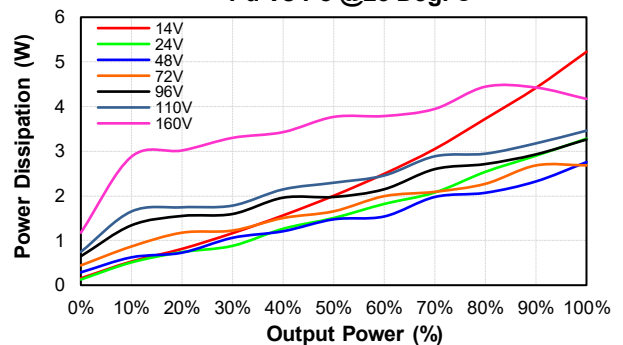
EC7BW18-72S15-ECRT
Pd Vs Po @25 Deg. C



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



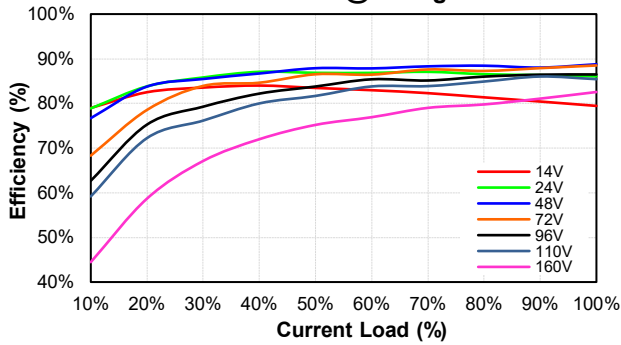
EC7BW18-72D12-ECRT
Pd Vs Po @25 Deg. C



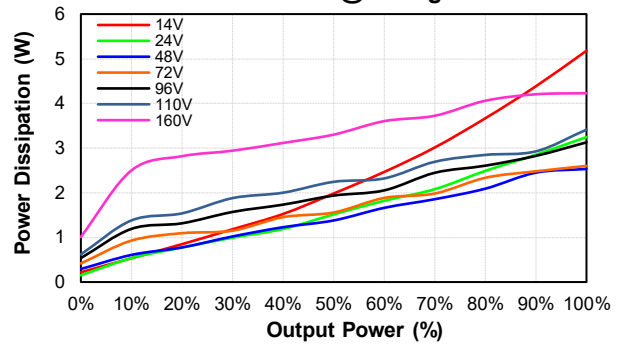


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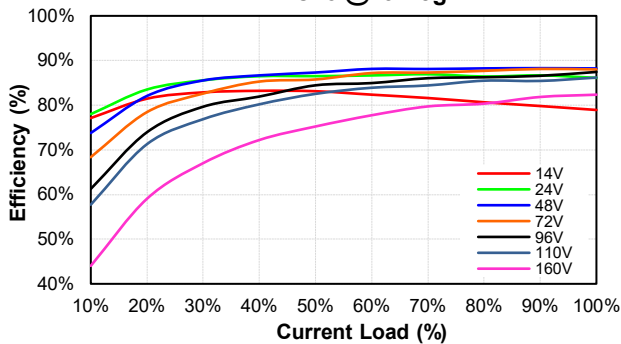
EC7BW18-72D15-ECRT
Eff Vs Io @25 Deg. C



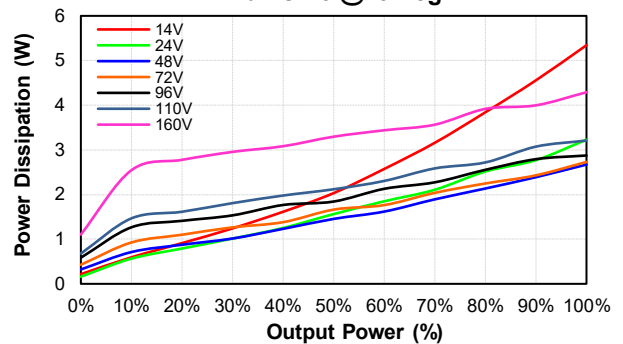
EC7BW18-72D15-ECRT
Pd Vs Po @25 Deg. C



EC7BW18-72D24-ECRT
Eff Vs Io @25 Deg. C

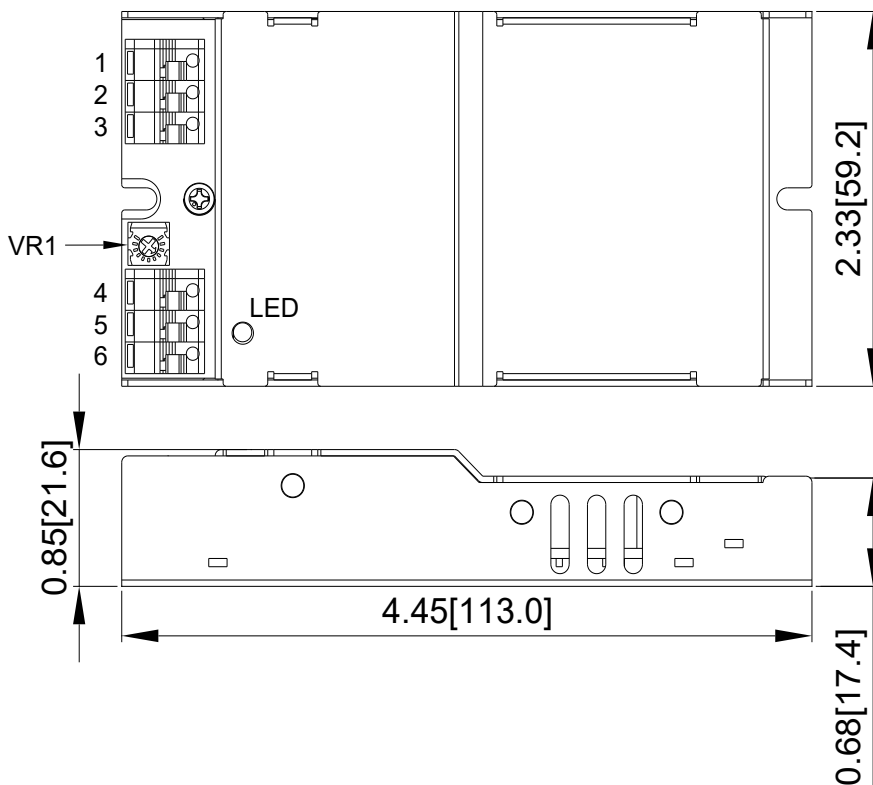


EC7BW18-72D24-ECRT
Pd Vs Po @25 Deg. C



MECHANICAL SPECIFICATION

EC7BW18-72XXX-ECRT

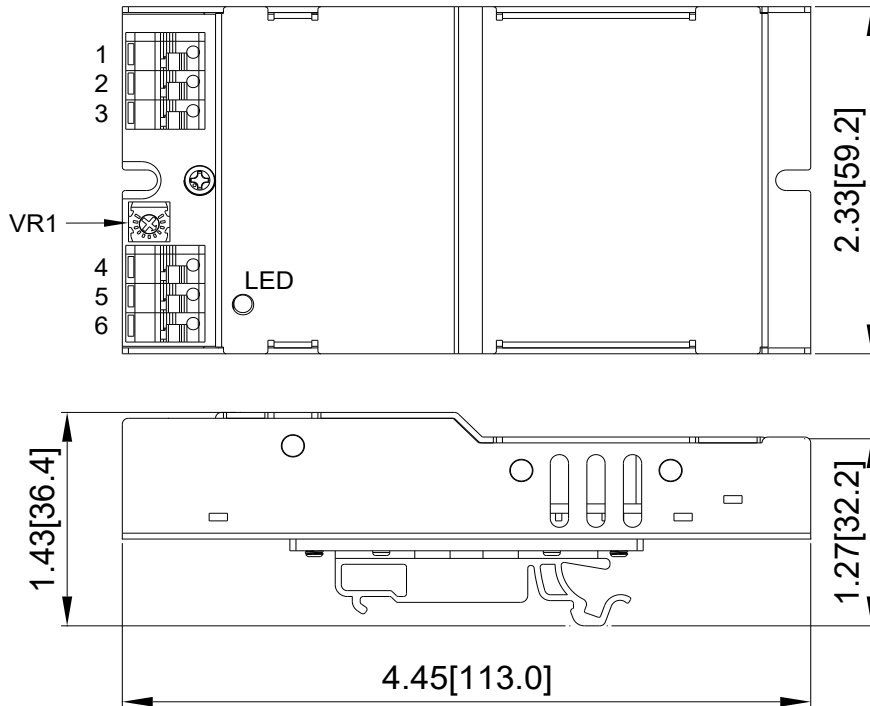




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MECHANICAL SPECIFICATION

EC7BW18-72XXX-EDRT



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

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

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