ECB40W18 ECRT/EDRT SERIES
40 WATT 16:1 INPUT
ISOLATED DC-DC CONVERTERS

Features

- Efficiency Up to 89%
- 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
- UL 62368-1 3rd (Reinforced Insulation) Approval for DC Modules
- Compliant with EN 55032, EN 55035, EN 50155, 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
- 5.63"x2.56"x0.87" Size at ECRT
- 5.63"x2.56"x1.54" Size at EDRT



CE UKCA Railway System

MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT		INPUT CURRENT		% EFF.	CAPACITOR LOAD MAX.
			MIN.	MAX.	NO LOAD	FULL LOAD		
ECB40W18-72S05-ZZZZ	10-160 VDC	5 VDC	0 mA	8000 mA	10 mA	639 mA	87	25600uF
ECB40W18-72S12-ZZZZ	10-160 VDC	12 VDC	0 mA	3333 mA	10 mA	624 mA	89	5600uF
ECB40W18-72S15-ZZZZ	10-160 VDC	15 VDC	0 mA	2666 mA	10 mA	635 mA	87.5	3300μF
ECB40W18-72S24-ZZZZ	10-160 VDC	24 VDC	0 mA	1666 mA	10 mA	631 mA	88	1500μF
ECB40W18-72S54-ZZZZ	10-160 VDC	54 VDC	0 mA	740 mA	20 mA	631 mA	88	440μF

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. ECB40W18-72SXX-ZZZZ 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 (Option)	Heatsink (Option)
ECB40W18-	II	O	XX	-ZZZZ	W	YYYYYY
ECB40W18	72 : 72VDC	S : Single	05 : 5.0VDC 12 : 12VDC 15 : 15VDC 24 : 24VDC 54 : 54VDC	ECRT : Enclosed Chassis Mount + Railway Turnkey EDRT : Enclosed Chassis Mount + Din Rail + Railway Turnkey	None : Without Protective Coating P : With Protective Coating	None : Without Heatsink +FBL127: With FBL127 Heatsink

Part Number Example:

ECB40W18-72S12-EDRTP+FBL127: Enclosed Chassis Mount + Din Rail, 40W, 16:1 10-160Vdc Input, Single 12Vdc Output, With Protective Coating, With FBL127 Heatsink.

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 Ambient Temperature		All	-40		95	℃
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	60% Load	All	7.9	8.7	9.9	V_{dc}
Turn-Off Voltage Threshold	60% Load	All	7.2	8.0	9.2	V_{dc}
Lockout Hysteresis Voltage	60% Load	All		0.7		V_{dc}
Maximum Input Current	V_{in}=14V, Full load	All		4.5		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℃	All	-1.0		+1.0	%
Output Voltage Regulation						
Load Regulation	Full load to no load	All			±1.5	%
Line Regulation	V_{in}=High line to low line, full load	All			±0.2	%
Temperature Coefficient	T_c=-40℃ to 105℃	All			±0.02	%/℃
Output Voltage Ripple and Noise (5Hz to 20MHz bandwidth)						
Peak-to-Peak	Full load, 1.0uF ceramic capacitors	5Vo			100	mV
		12Vo			150	
		15Vo			150	
		24Vo			240	
		54Vo			540	
RMS.		5Vo			40	mV
		12Vo			60	
		15Vo			60	
		24Vo			100	
		54Vo			220	
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	190	%
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 ≦ $I_{o_max.}$	54Vo	-20		+10	%
		Others	-20		+15	
Over Voltage Protection	Zener or TVS clamp	5Vo		6.2		Vdc
		12Vo		15		
		15Vo		18		
		24Vo		30		
		54Vo		70.2		

EFFICIENCY

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
100% Load	V_{in}=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 di/dt=0.1A/us (within 1% V_{out} nominal)	All			±5	%
Recovery Time		All		250	350	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 4200	V_{ac} V_{dc}
	1 Minute; input to case				2100 3000	V_{ac} V_{dc}
	1 Minute; output to case				1500 2100	V_{ac} V_{dc}
Isolation Resistance	Input to output	All	1000			MΩ
Isolation Capacitance	Input to output	All		15000		pF
	Input to case	5Vo 12Vo others		7500 4500 10000		
	Output to case	5Vo 12Vo 15Vo 24Vo 54Vo		7500 4500 12000 12000 17000		

FEATURE CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Switching Frequency	Pulse width modulation (PWM), fixed	5Vo 12Vo	180	200	220	KHz
		15Vo 24Vo 54Vo	207	230	253	
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	$I_{on/off}$ 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 for internal DC module, non-latching	All		110		℃
Over Temperature Recovery		All		92		℃

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 72S12 72S15 72S24 72S54		601 588 591 613 612		K hours
Weight		ECRT(P) EDRT(P) ECRT(P) +FBL127 EDRT(P) +FBL127		220 235 340 355		grams
Case plate Material	Aluminum					
Potting Material	UL 94V-0 (DC Module)					
Shock/Vibration	EN61373 Compliant					
Humidity	95% RH max. Non condensing					
Altitude	5000m Operating altitude, 12000m Transport altitude					
Thermal Shock	Meet MIL-STD-810F					
Fire & Smoke	EN 45545-2 Compliant					
EMI	EN 55032 & EN 50155 Compliant					Class A
ESD	EN 61000-4-2	Level 3: Air ±8kV, Contact ±6kV				Perf. Criteria A
Radiated Immunity	EN 61000-4-3	Level 3: 80~1000MHz, 20V/m				Perf. Criteria A
Fast Transient	EN 61000-4-4	Level 3: On power input port, ±2kV				Perf. Criteria A
Surge	EN 61000-4-5	Level 4: Line to earth, ±4kV, Line to line, ±2kV (EN 50155) Level 3: Line to earth, ±2kV, Line to line, ±1kV (EN 55035)				Perf. Criteria A
Conducted Immunity	EN 61000-4-6	Level 3: 0.15~80MHz, 10V				Perf. Criteria A
Magnetic field immunity	EN 61000-4-8	Level 1: 50Hz, 1A/m (EN 55035)				Perf. Criteria A
Interruptions of Voltage Supply	EN 50155	Class S3: 20ms interruptions				Perf. Criteria A
Supply Change Over	EN 50155	Class C2: During a supply break of 30ms				Perf. Criteria A
Application Note Link						ECB40W18 EC(D)RT Series App Notes
Packaging Information Link						Packaging Information

Immunity to Environmental Conditions

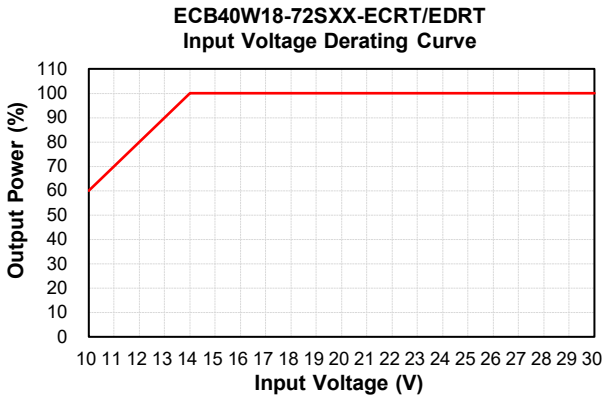
Phenomenon	EN 50155; 2021 Reference Clause(s)	Reference Standard	Test Conditions	Result
Low Temperature Test	13.4.4	EN 60068-2-1	Class OT4 Temperature: -40℃ Duration: 2 hrs	Pass
Dry Heat Test	13.4.5	EN 60068-2-2	Class OT4 & Cycle A Temperature: 70℃ Duration: 6 hrs	Pass
Low Temperature Storage Test	13.4.6	EN 60068-2-1	Temperature: -40℃ Duration: 16 hrs	Pass
Cyclic Damp Heat Test	13.4.8	EN 60068-2-30	Temperature: 25℃ - 55℃ Humidity: 90% RH Duration: 48 hrs	Pass
Functional Random Vibration Test	13.4.10	EN 61373	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	13.4.10	EN 61373	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	13.4.10	EN 61373	±Vertical: 30 m/s^2 ±Transverse: 30 m/s^2 ±Longitudinal: 50 m/s^2 Duration: 30ms x18 (Each axis 3 shocks)	Pass

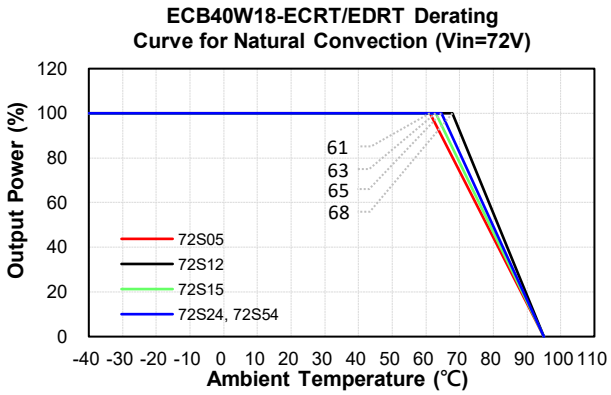
EN 45545-2 Fire & Smoke Test Conditions.

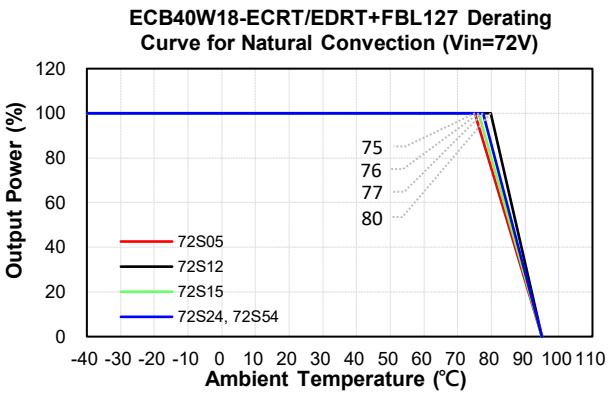
Item		Standard	Hazard Level
R22	Oxygen Index Test	EN 45545-2: 2013+A1:2015 EN ISO 4589-2: 2017	HL1, HL2, HL3
	Smoke Density Test	EN 45545-2: 2013+A1:2015 EN ISO 5659-2: 2017	HL1, HL2, HL3
	Smoke Toxicity Test	EN 45545-2: 2013+A1:2015 NF X70-100-1&2: 2006	HL1, HL2, HL3
R23	Oxygen Index Test	EN 45545-2: 2013+A1:2015 EN ISO 4589-2: 2017	HL1, HL2, HL3
	Smoke Density Test	EN 45545-2: 2013+A1:2015 EN ISO 5659-2: 2017	HL1, HL2, HL3
	Smoke Toxicity Test	EN 45545-2: 2013+A1:2015 NF X70-100-1&2: 2006	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

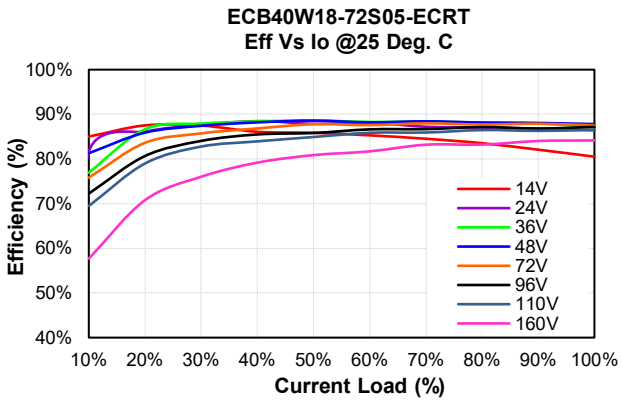
Power Derating Curve

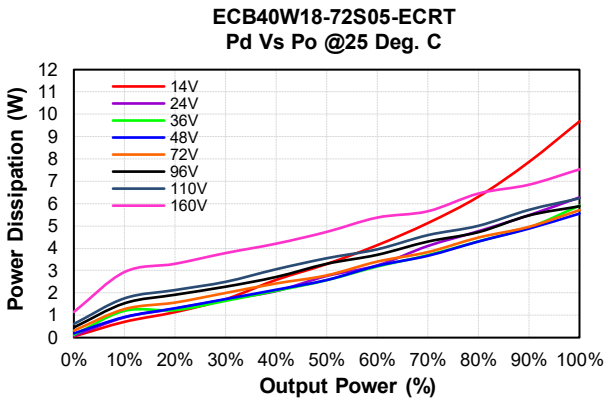




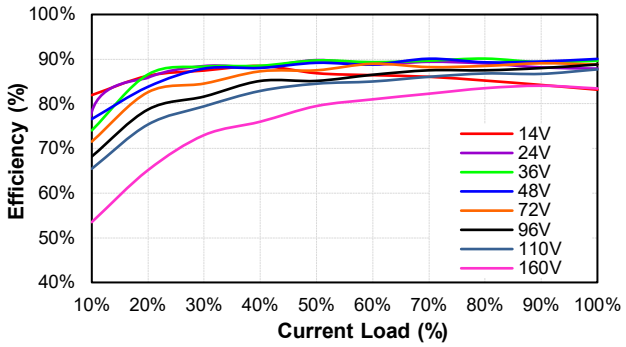


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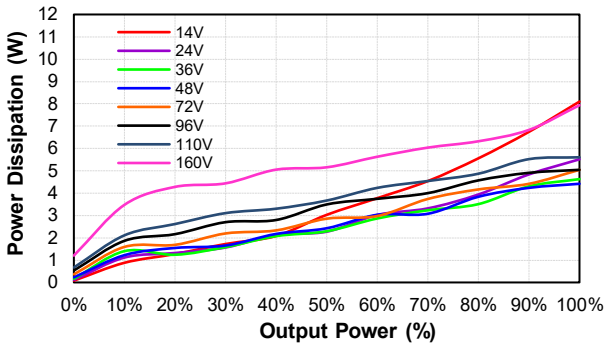




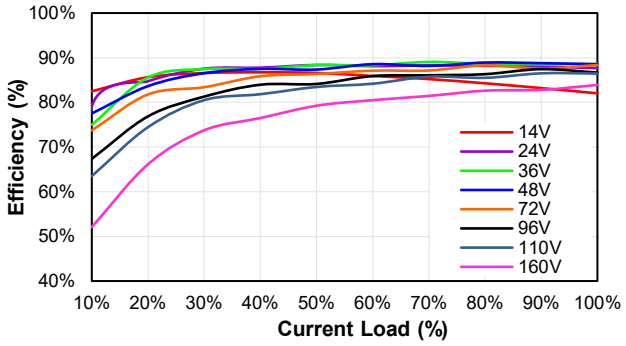
ECB40W18-72S12-ECRT
Eff Vs Io @25 Deg. C



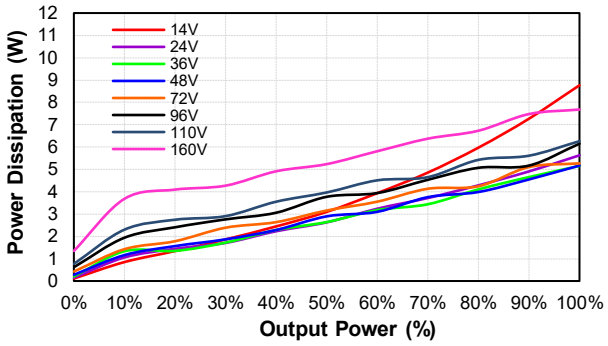
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Pd Vs Po @25 Deg. C



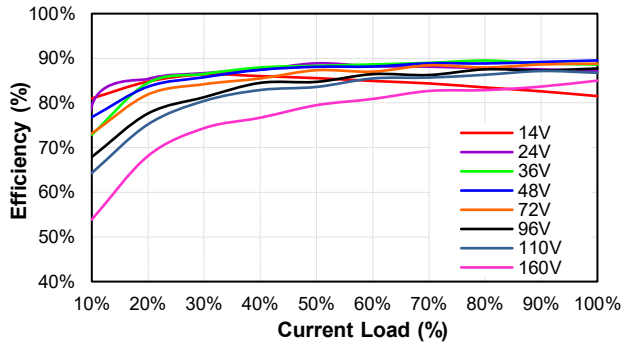
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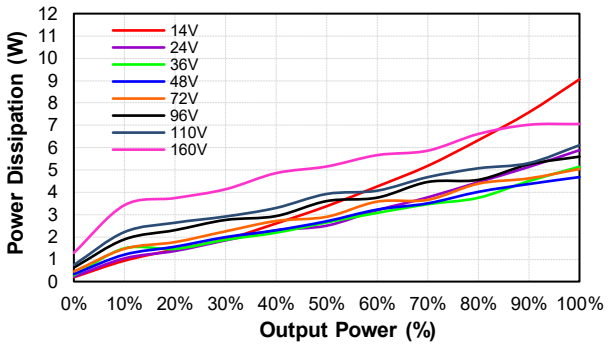
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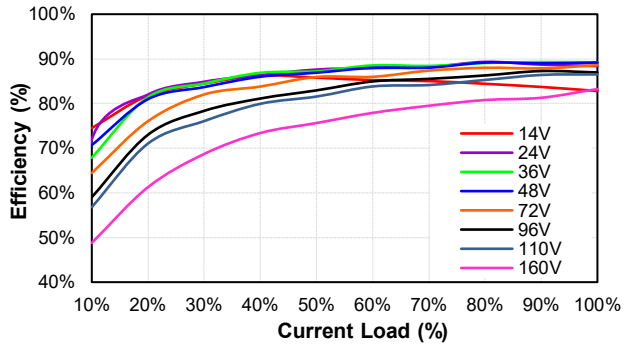
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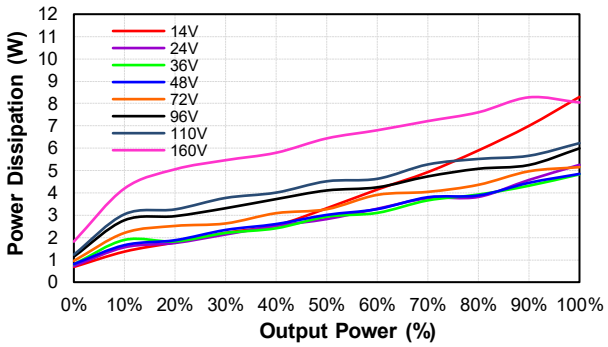
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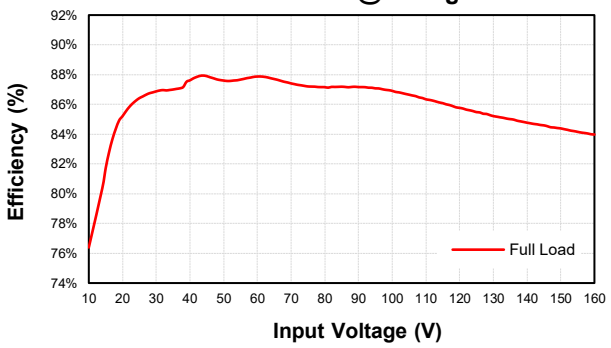
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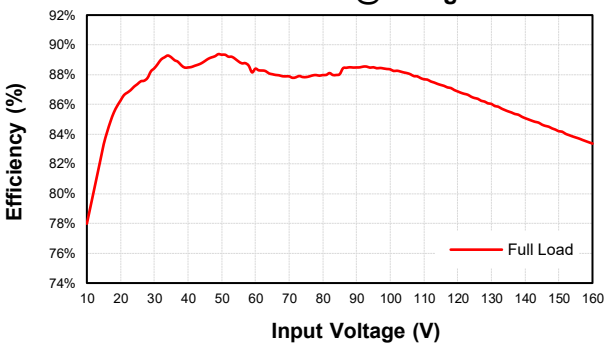
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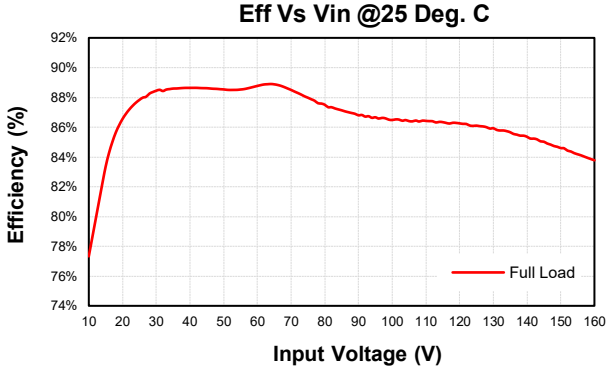
ECB40W18-72S05-ECRT
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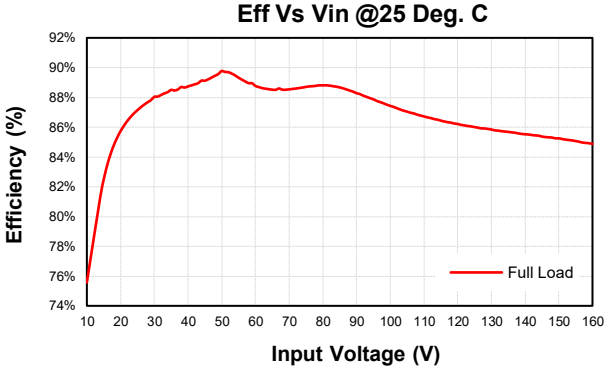
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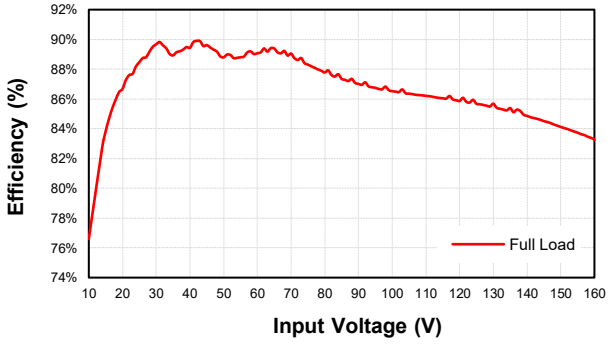
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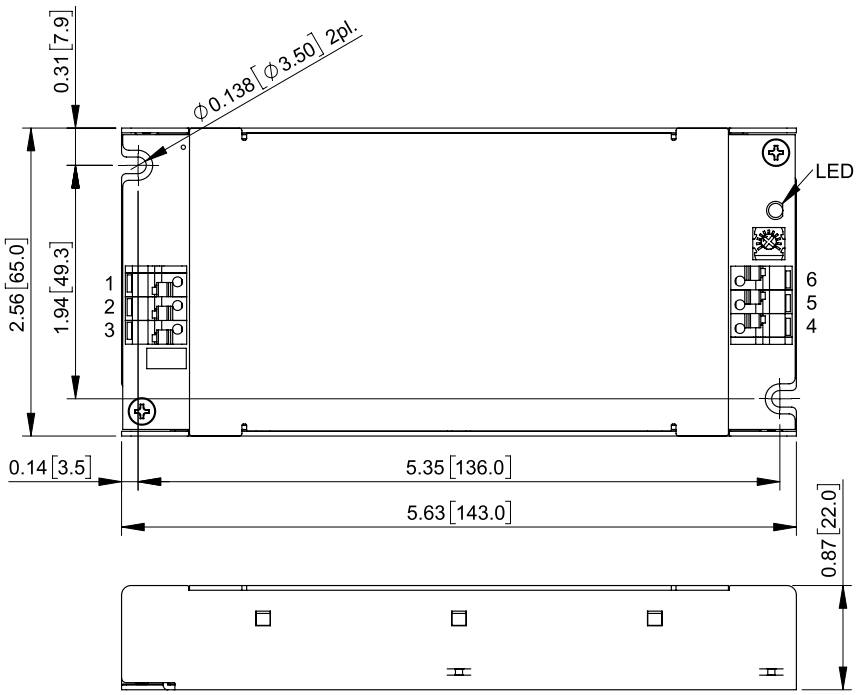
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MECHANICAL SPECIFICATION

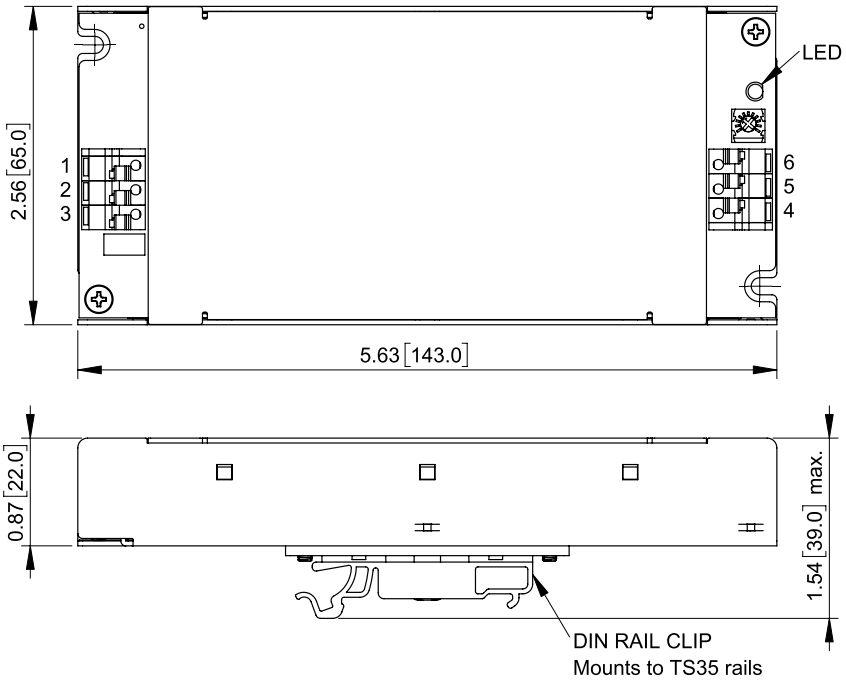


ECRT(P)

All Dimensions in Inches[mm]
Tolerance Inches: x.xx=±0.02, x .xxx=±0.010
Millimeters: x.x=±0.5, x.xx=±0.25

Pin Connection

Pin	Function
1	Remote
2	-V Input
3	+V Input
4	+V Output
5	NC
6	-V Output



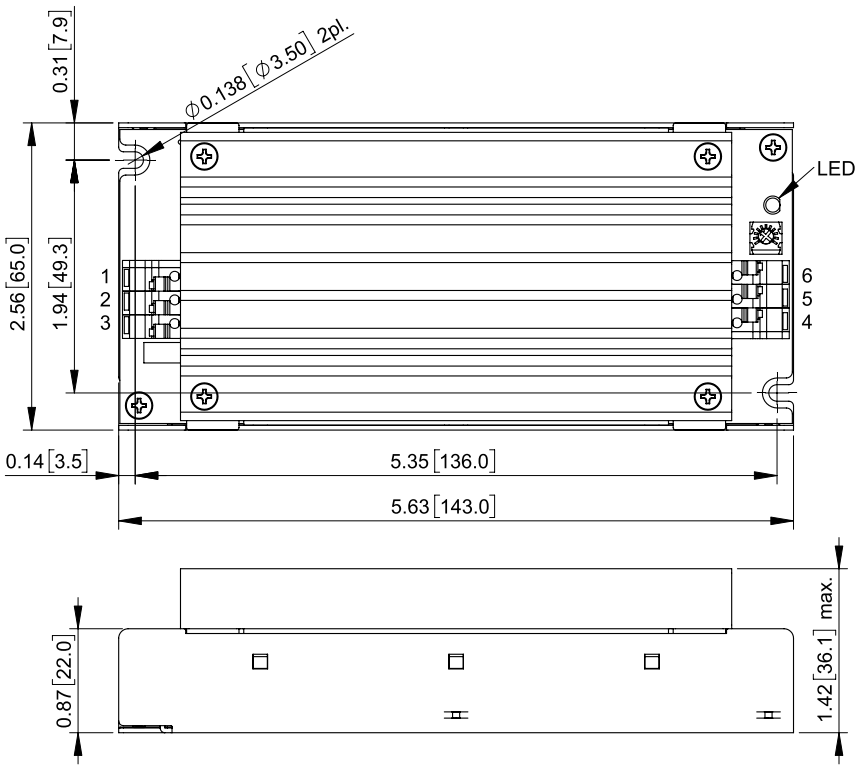
EDRT(P)

All Dimensions in Inches[mm]
Tolerance Inches: x.xx=±0.02, x .xxx=±0.010
Millimeters: x.x=±0.5, x.xx=±0.25

Pin Connection

Pin	Function
1	Remote
2	-V Input
3	+V Input
4	+V Output
5	NC
6	-V Output

MECHANICAL SPECIFICATION

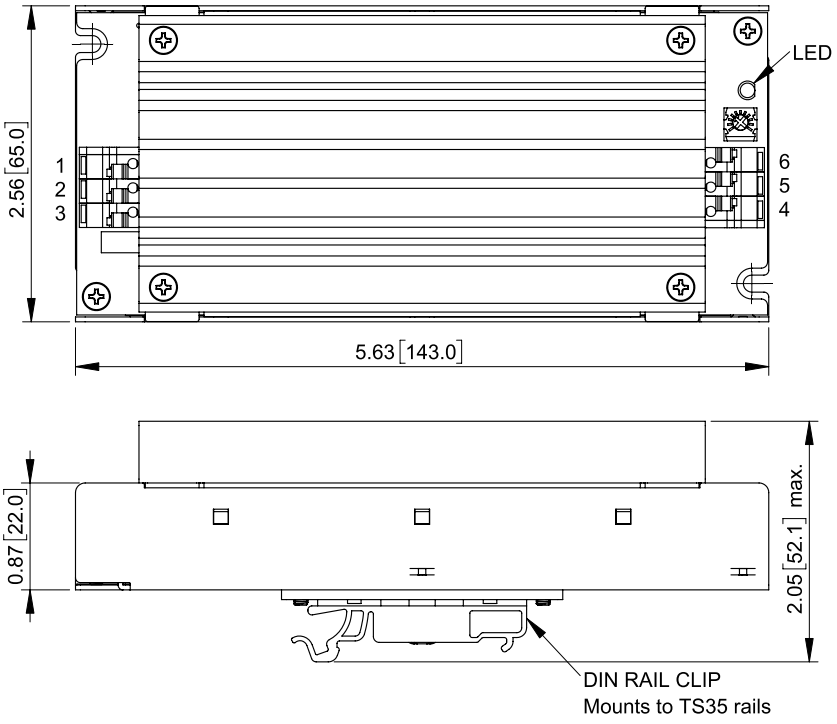


ECRT(P)+FBL127

All Dimensions in Inches[mm]
Tolerance Inches: x.xx=±0.02, x .xxx=±0.010
Millimeters: x.x=±0.5, x.xx=±0.25

Pin Connection

Pin	Function
1	Remote
2	-V Input
3	+V Input
4	+V Output
5	NC
6	-V Output



EDRT(P)+FBL127

All Dimensions in Inches[mm]
Tolerance Inches: x.xx=±0.02, x .xxx=±0.010
Millimeters: x.x=±0.5, x.xx=±0.25

Pin Connection

Pin	Function
1	Remote
2	-V Input
3	+V Input
4	+V Output
5	NC
6	-V Output

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