



ECLB40W-110 SERIES 33-40 WATT 4:1 INPUT ISOLATED DC-DC CONVERTER

Features

- Efficiency Up to 91%
- Fixed Switching Frequency
- Regulated Outputs
- Remote On/Off
- Low No Load Power Consumption
- Fully Protected (OTP/OCP/OVP/UVLO)
- 3000 Vdc I/O Isolation
- Operating Case Temperature -40 to +105°C
- No Tantalum Capacitor Inside
- 2.05"x1.2"x0.4" Six-Sided Shield Metal Case
Standard 2"x1" Pin Out Compatible
- UL 60950-1 2nd (Basic Insulation) Approval
- EN 50155 Compliant with External Circuits
- Shock & Vibration EN 50155 (EN 61373) Compliant
- Fire & Smoke EN 45545-2 Compliant
- 3000m Operating Altitude
- Full Load Operation up to 69°C with Heat Sink
LBT127 (M-C655) Natural Convection
- Safety Meets IEC/EN/UL 62368-1



MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT		INPUT CURRENT		% EFF. (1)	CAPACITOR LOAD MAX.
			MIN.	MAX.	NO LOAD	FULL LOAD		
ECLB40W-110S33	43-160 VDC	3.3 VDC	0 mA	10 A	6 mA	340 mA	88	10000µF
ECLB40W-110S05	43-160 VDC	5 VDC	0 mA	8 A	6 mA	409 mA	88.5	8000µF
ECLB40W-110S12	43-160 VDC	12 VDC	0 mA	3.333 A	6 mA	404 mA	90	3300µF
ECLB40W-110S15	43-160 VDC	15 VDC	0 mA	2.666 A	6 mA	399 mA	91	2700µF
ECLB40W-110D12	43-160 VDC	±12 VDC	0 mA	±1.667 A	6 mA	408 mA	88	1650µF
ECLB40W-110D15	43-160 VDC	±15 VDC	0 mA	±1.333 A	6 mA	408 mA	88.5	1350µF
ECLB40W-110D24	43-160 VDC	±24 VDC	0 mA	±0.833 A	6 mA	408 mA	89	850µF

NOTE:

1. Nominal Input Voltage 110 VDC
2. To Meet EN50155 and RIA12 refer to Application Note.

PART NUMBER

Series	Nominal Input Voltage	Number of Outputs	Nominal Output Voltage	Remote On/Off Logic
ECLB40W-110	II	O	XX	L
ECLB40W	110 : 110 VDC	S : Single D : Dual	33 : 3.3VDC 05 : 5.0VDC 12 : 12VDC 15 : 15VDC 12 : ±12VDC 15 : ±15VDC 24 : ±24VDC	None : Positive N : Negative

Part Number Example:

ECLB40W-110S12N: LB Case, 40W, 4:1 9-36Vdc Input, Single 12Vdc Output, Negative Logic



ECLB40W-110 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 Ambient Temperature	At the center part of case plate (with derating)	All	-40		105	°C
Maximum Case Temperature		All			105	°C
Storage Temperature		All	-55		125	°C

INPUT CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units	
Operating Input Voltage		All	43	110	160	V _{dc}	
Input Under Voltage Lockout							
Turn-On Voltage Threshold		All	38.5	40V	41.5	V _{dc}	
Turn-Off Voltage Threshold		All	36.5	38V	39.5	V _{dc}	
Lockout Hysteresis Voltage		All		2		V _{dc}	
Maximum Input Current	V _{in} =43V, Full load	All		1.1		A	
No-Load Input Current	V _{in} =110V, I _o =0A	See Model Number Table					mA
Input Filter	Pi filter	All					
Inrush Current (I ² t)	As per ETS300 132-2	All			0.1	A ² s	
Input Reflected Ripple Current	P-P thru 12uH inductor, 5Hz to 20MHz	All			30	mA	

OUTPUT CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units	
Voltage Set Point Accuracy	V _{in} =110V, Full load, T _c =25°C	All	-1.0		+1.0	%	
Output Voltage Balance	V _{in} =110V, Full load, T _c =25°C	Dual	-1.0		+1.0	%	
Output Voltage Regulation							
Load Regulation	Full Load to no load	Single Dual			±0.5 ±1.0	%	
Line Regulation	V _{in} =High line to low line, full load	All			±0.2	%	
Cross Regulation	Load cross variation 10%/100%	Dual			±5.0	%	
Temperature Coefficient	T _c =-40°C to 105°C	All			±0.02	%/°C	
Output Voltage Ripple and Noise (5Hz to 20MHz bandwidth)							
Peak-to-Peak	Full load, 1uF ceramic capacitors	3.3Vo 5Vo ±24Vo Others			100 100 200 150	mV	
Output Current Range	V _{in} = 43 to 110V	See Model Number Table					A
Over Current Protection	Hiccup mode. Auto recovery	All	110	135	170	%	
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.}	All	-10		+10	%	
Over Voltage Protection	Zener or TVS clamp	3.3Vo 5.0Vo 12Vo 15Vo ±12Vo ±15Vo ±24Vo		3.9 6.2 15 18 ±15 ±18 ±30		V _{dc}	



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EFFICIENCY

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
100% Load	$V_{in}=110V$, Full load	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						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				7	ms
Turn-On Delay Time, From Input	V_{in_min} . to 10% V_{o_set} , Power up	All				7	ms
Output Voltage Rise Time	10% V_{o_set} to 90% V_{o_set}	Single				8	ms
		Dual				18	

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				1800	V_{ac}
						3000	V_{dc}
	1 Minute; input to case					1000	V_{ac}
						1600	V_{dc}
	1 Minute; output to case					1000	V_{ac}
						1600	V_{dc}
Isolation Resistance	Input to output	All	1000			$M\Omega$	
Isolation Capacitance	Input to output	All	1500			pF	
	Input to case	All	1000				
	Output to case	All	1000				

FEATURE CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units		
Switching Frequency	Pulse width modulation (PWM), fixed	All	225	250	275	KHz		
On/Off Control, Positive Remote On/Off Logic, Refer to -Vin Pin.								
Logic Low (Module Off)	$V_{on/off}$ at $I_{on/off}=1.0mA$	All	0			1.2	V	
Logic High (Module On)	$V_{on/off}$ at $I_{on/off}=0.0uA$, Pin open=On	All	3.5 or Open Circuit			75	V	
On/Off Control, Negative Remote On/Off Logic, Refer to -Vin Pin								
Logic High (Module Off)	$V_{on/off}$ at $I_{on/off}=0.0uA$, Pin open=Off	All	3.5 or Open Circuit			75	V	
Logic Low (Module On)	$V_{on/off}$ at $I_{on/off}=1.0mA$	All	0			1.2	V	
On/Off Current (for Both Remote On/Off Logic)	$I_{on/off}$ at $V_{on/off}=0V$	All	0.3			1	mA	
Leakage Current (for Both Remote On/Off Logic)	Logic high, $V_{on/off}=15V$	All				30	uA	
Off Converter Input Current	Shutdown input idle current	All				4	10	mA
Over Temperature Shutdown	Temperature at the center part of case, non-latching	All				110	°C	
Over Temperature Recovery						100	°C	



ECLB40W-110 Series

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	3.3Vo		889		K hours
		5.0Vo		722		
		12Vo		798		
		15Vo		874		
		±12Vo		889		
		±15Vo		1007		
Weight		All		36		grams
Case Material	Aluminum,					
Base Plate Material	FR4					
Potting Material	UL 94V-0					
Pin Material	Base: Copper Plating: Matte Tin					
Shock/Vibration	MIL-STD-810F/EN 61373 Compliant					
Humidity	95% RH max. Non Condensing					
Altitude	3000m Operating Altitude, 12000m Transport Altitude					
Thermal Shock	MIL-STD-810F					
Fire & Smoke	EN 45545-2 Compliant					

EMC SPECIFICATIONS (External components required, please refer to application note.)

EMI	Meet EN 55011/EN 55032/EN 50155 (with external filter)			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 4: On power input port, ±4kV, external components required		Perf. Criteria A		
Surge	EN 61000-4-5	Level 4: Line to line, ±1kV, external components required		Perf. Criteria A		
Conducted Immunity	EN 61000-4-6	Level 3: 0.15~80MHz, 10V		Perf. Criteria A		
Interruptions of Voltage Supply	EN 50155	Class S3: 20ms interruptions with external hold up circuit and capacitor required		Perf. Criteria A		
Supply Change Over	EN 50155	Class C2: During a supply break of 30ms with external hold up circuit and capacitor required		Perf. Criteria A		
Application Note Link				ECLB40W-110 Series App Notes		
Packaging Information Link				Packaging Information		



ECLB40W-110 Series

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: 0.98 m/s ² Transverse: 0.44 m/s ² Longitudinal: 0.69 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: 2.5 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

EN45545-2 Fire & Smoke Test Conditions

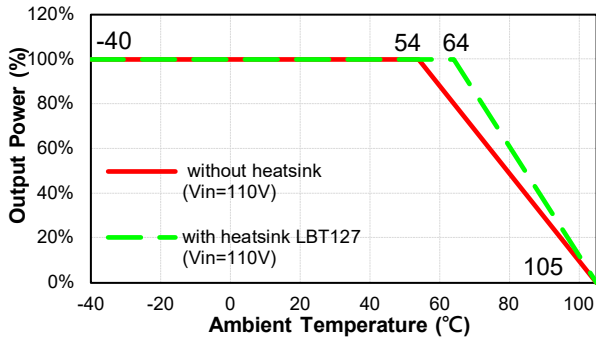
Item		Standard	Hazard Level
R22	Oxygen Index Test	EN 45545-2: 2013 EN ISO 4589-2: 2006	HL1, HL2, HL3
	Smoke Density Test	EN 45545-2: 2013 EN ISO 5659-2: 2013	HL1, HL2, HL3
	Smoke Toxicity Test	EN 45545-2: 2013 NF X70-100: 2006	HL1, HL2, HL3
R23	Oxygen Index Test	EN 45545-2: 2013 EN ISO 4589-2: 2006	HL1,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



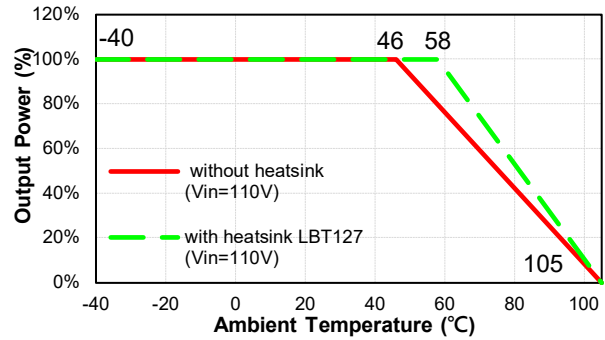
CHARACTERISTIC CURVE

Power Derating Curve

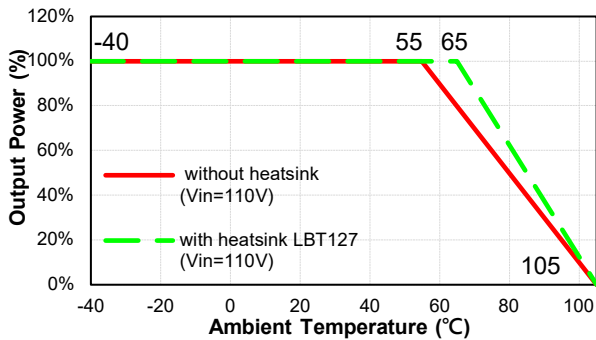
ECLB40W-110S33 Derating Curve



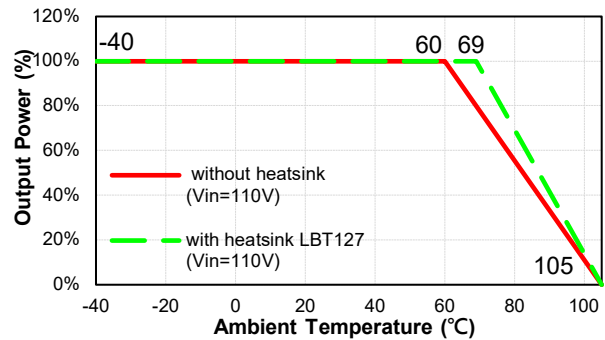
ECLB40W-110S05 Derating Curve



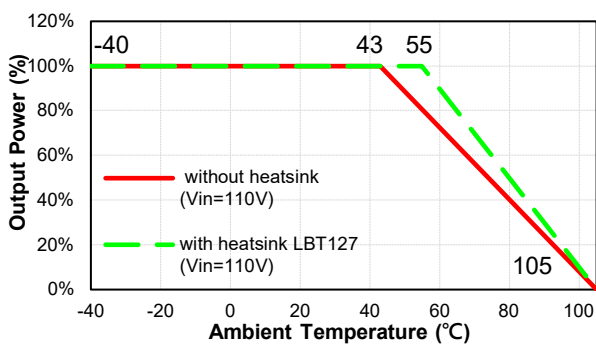
ECLB40W-110S12 Derating Curve



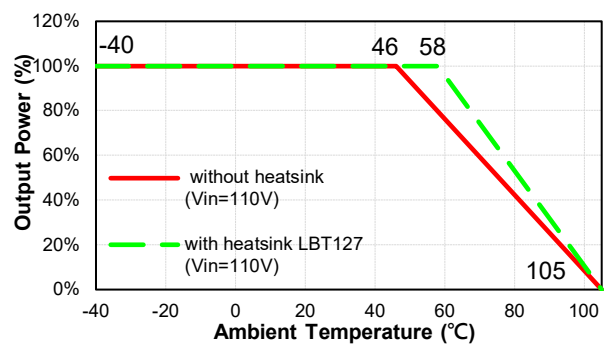
ECLB40W-110S15 Derating Curve



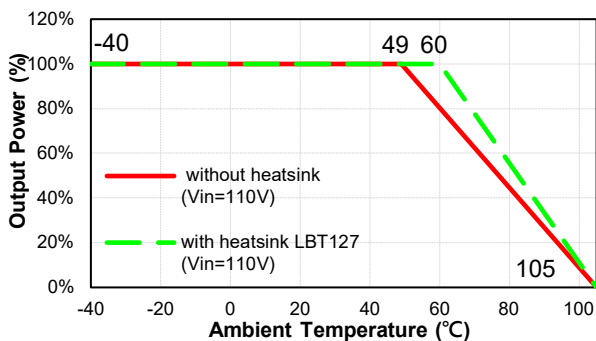
ECLB40W-110D12 Derating Curve



ECLB40W-110D15 Derating Curve



ECLB40W-110D24 Derating Curve

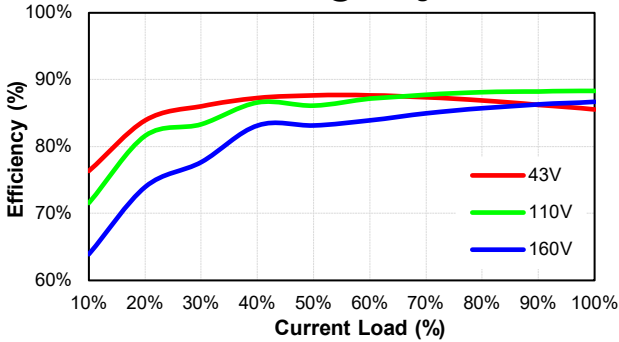




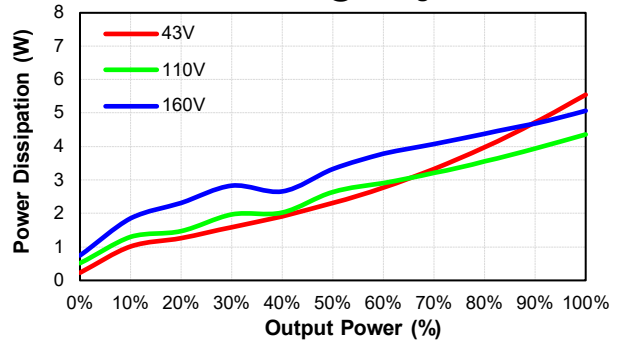
ECLB40W-110 Series

Performance Data

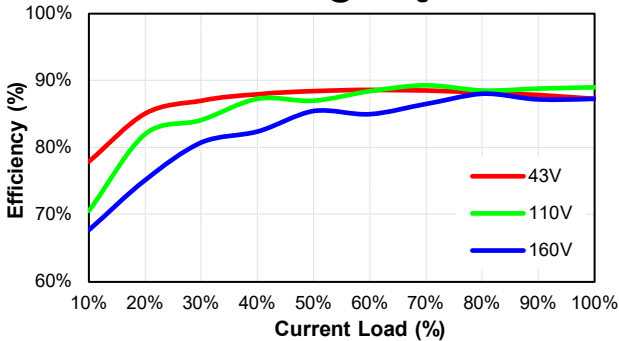
ECLB40W-110S33
Eff Vs Io @25 Deg. C



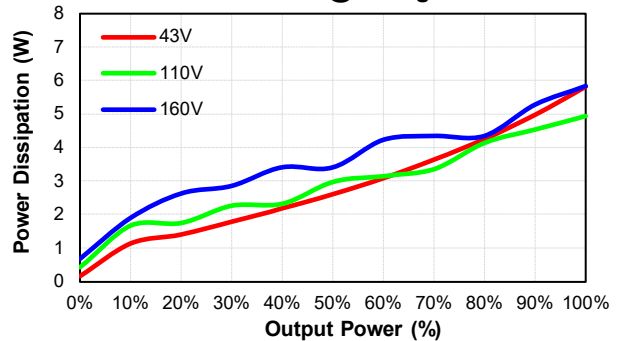
ECLB40W-110S33
Pd Vs Po @25 Deg. C



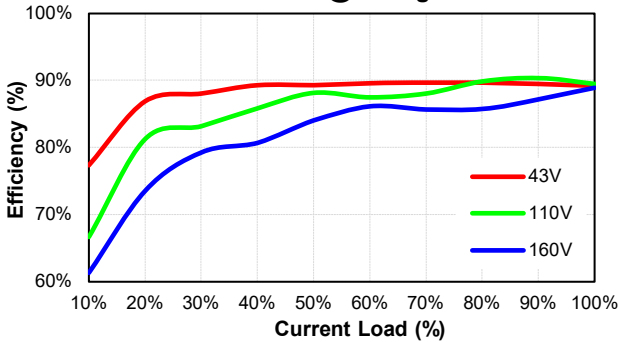
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Eff Vs Io @25 Deg. C



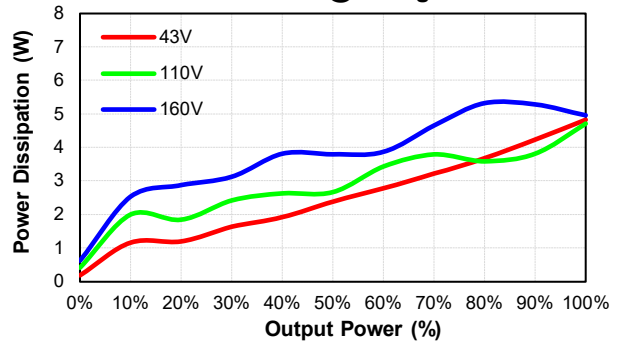
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Pd Vs Po @25 Deg. C



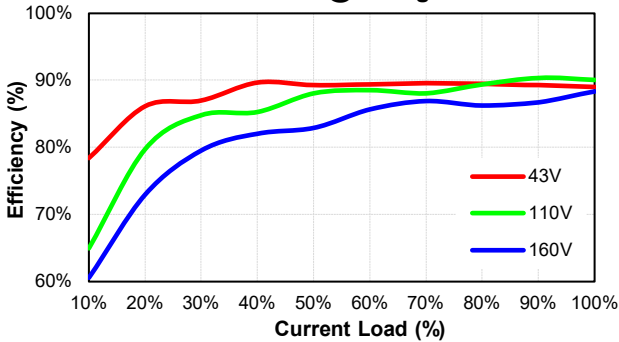
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Eff Vs Io @25 Deg. C



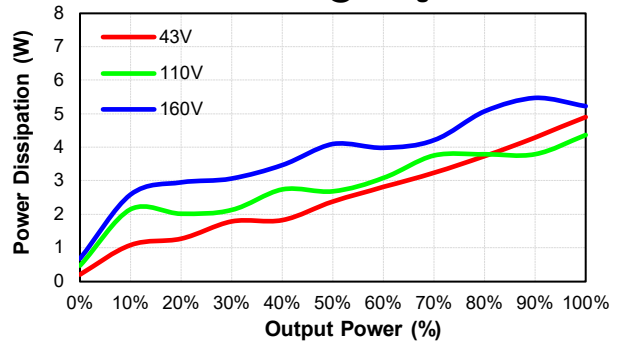
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ECLB40W-110S15
Eff Vs Io @25 Deg. C



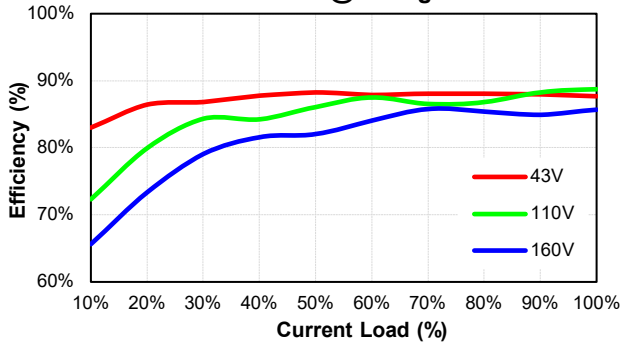
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Pd Vs Po @25 Deg. C



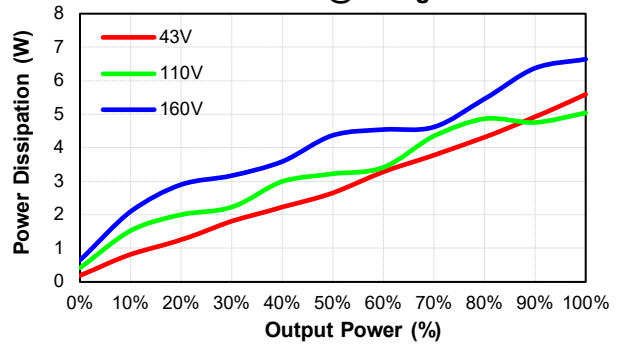


ECLB40W-110 Series

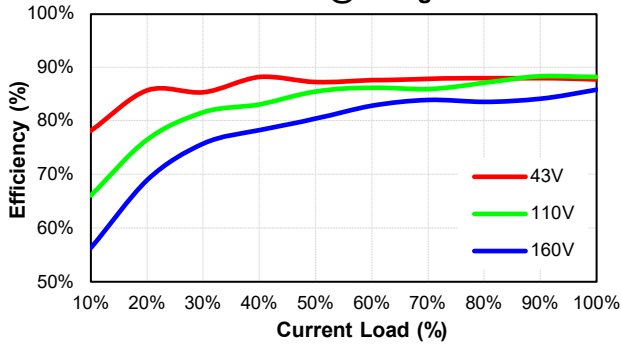
ECLB40W-110D12
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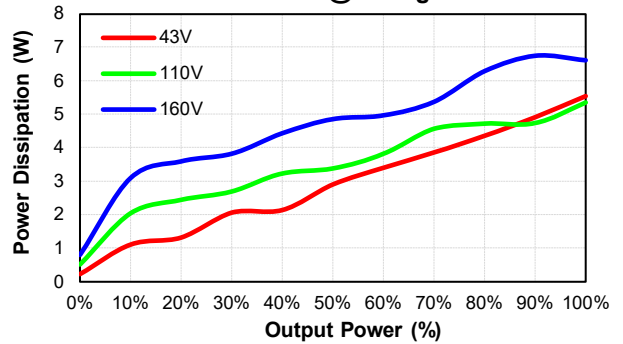
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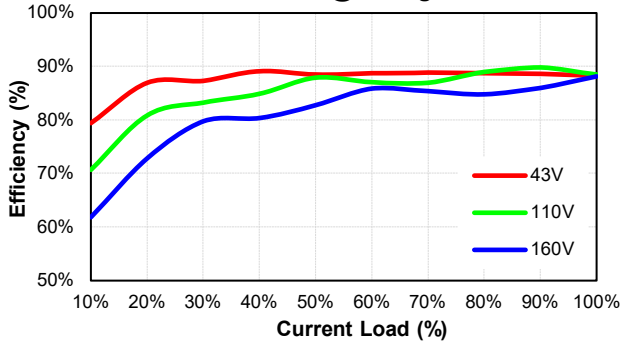
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Eff Vs Io @25 Deg. C



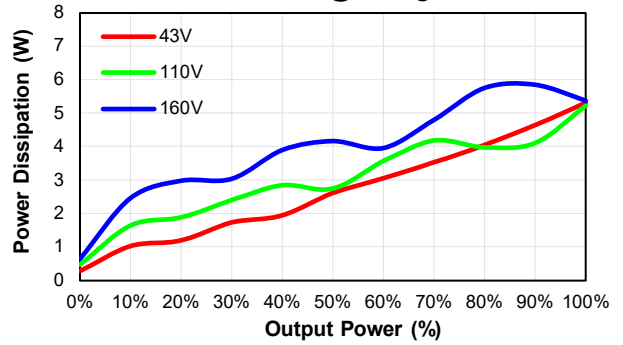
ECLB40W-110D15
Pd Vs Po @25 Deg. C



ECLB40W-110D24
Eff Vs Io @25 Deg. C



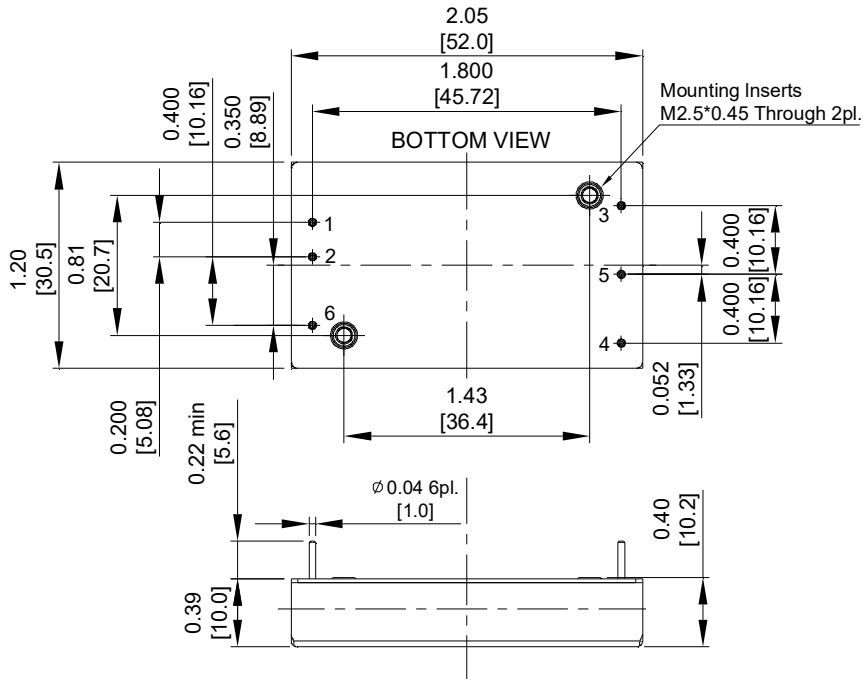
ECLB40W-110D24
Pd Vs Po @25 Deg. C





ECLB40W-110 Series

MECHANICAL SPECIFICATION



PIN CONNECTION		
PIN	Single Output	Dual Output
1	+V Input	+V Input
2	-V Input	-V Input
3	+V Output	+V Output
4	Trim	-V Output
5	-V Output	Common
6	Remote On/Off	

NOTE: Pin Size is 0.04±0.004 Inch (1.0±0.1 mm)DIA
 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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