



# ECLB60W SERIES 60 WATT 4:1 INPUT ISOLATED DC-DC CONVERTER

## Features

- Efficiency Up to 92%
- Fixed Switching Frequency
- Regulated Outputs
- Remote On/Off
- Low No Load Power Consumption
- Fully protected (OTP/OCP/OVP/UVLO)
- 1500Vdc I/O Isolation
- Operating Case Temperature -40 to +105°C
- 2.05"x1.2"x0.4" Six-Sided Shield Metal Case  
Standard 2"X1" Pin Out Compatible
- Safety Meets IEC/EN/UL 62368-1
- Full Load Operation up to 60°C with Heat Sink  
LBT127 (M-C655) Natural Convection
- -55°C Operating Available (Suffix "-M2")



MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT		INPUT CURRENT		% EFF.		CAPACITOR LOAD MAX.
			MIN.	MAX.	NO LOAD	FULL LOAD	(3)	(2)	
ECLB60W-24S33	9-36 VDC	3.3 VDC	0 mA	15 A	10 mA	2279 mA	90.5	90	15000uF
ECLB60W-24S05	9-36 VDC	5.0 VDC	0 mA	12 A	10 mA	2717 mA	92	92	12000uF
ECLB60W-24S12	9-36 VDC	12 VDC	0 mA	5 A	10 mA	2717 mA	92.5	92	5000µF
ECLB60W-24S15	9-36 VDC	15 VDC	0 mA	4 A	10 mA	2717 mA	92	91	4000µF
ECLB60W-24D12	9-36 VDC	±12 VDC	0 mA	±2.5 A	12 mA	2747 mA	91	91	2500uF
ECLB60W-24D15	9-36 VDC	±15 VDC	0 mA	±2.0 A	12 mA	2747 mA	92	91	2000uF
ECLB60W-48S33	18-75 VDC	3.3 VDC	0 mA	15 A	8 mA	1140 mA	90.5	90	15000uF
ECLB60W-48S05	18-75 VDC	5.0 VDC	0 mA	12 A	8 mA	1359 mA	92	92	12000uF
ECLB60W-48S12	18-75 VDC	12 VDC	0 mA	5 A	8 mA	1359 mA	92.5	92	5000µF
ECLB60W-48S15	18-75 VDC	15 VDC	0 mA	4 A	8 mA	1359 mA	92	91	4000µF
ECLB60W-48D12	18-75 VDC	±12 VDC	0 mA	±2.5 A	8 mA	1374 mA	91	91	2500uF
ECLB60W-48D15	18-75 VDC	±15 VDC	0 mA	±2.0 A	8 mA	1374 mA	92	91	2000uF

**NOTE:**

1. Nominal Input Voltage 24 or 48VDC
2. Measured at Nominal Input Voltage
3. Measured at 12VDC for 24Vin, 24VDC for 48Vin
4. -55°C Start-up Screen per MIL-STD105E S1 Sampling Procedure for "-M2" Version

## PART NUMBER

Series	Nominal Input Voltage	Number of Outputs	Nominal Output Voltage	Remote On/Off Logic	Mounting Inserts		Operating Case Temp. Range
ECLB60W-	II	O	XX	L	-Y (Option)		-Z (Option)
ECLB60W	24: 24 VDC 48: 48 VDC	S: Single D: Dual	33: 3.3VDC 05: 5.0VDC 12: 12VDC 15: 15VDC 12: ±12VDC 15: ±15VDC	None: Positive N: Negative	None: -C:	M2.5x0.45 Mounting Inserts Clear Mounting Insert (2.65mm DIA.)	None: -40~105°C -M2: -55~105°C

**Part Number Example:**

**ECLB60W-24S12N:** LB Case, 60W, 4:1 18-75Vdc Input, Single 12Vdc Output, Negative Logic, Clear Mounting Insert



# ECLB60W 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	24Vin	-0.3		36	V <sub>dc</sub>
		48Vin	-0.3		75	
Input Surge Voltage	100ms max.	24Vin			50	V <sub>dc</sub>
		48Vin			100	
Operating Ambient Temperature	At the Center Part of Case Plate (with Derating)	All	-40		105	°C
	Suffix "-M2" (with Derating)	-M2	-55		105	
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		24Vin	9	24	36	V <sub>dc</sub>
		48Vin	18	48	75	
Input Under Voltage Lockout						
Turn-On Voltage Threshold		24Vin	8	8.5	8.8	V <sub>dc</sub>
		48Vin	16.5	17	17.5	
Turn-Off Voltage Threshold		24Vin	7.7	8	8.3	V <sub>dc</sub>
		48Vin	15.5	16	16.5	
Lockout Hysteresis Voltage		24Vin		0.5		V <sub>dc</sub>
		48Vin		1		
Maximum Input Current	V <sub>in</sub> =9V, Full Load.	24Vin		7.5		A
	V <sub>in</sub> =18V, Full Load.	48Vin		3.8		
No-Load Input Current	V <sub>in</sub> =24, 48V, I <sub>o</sub> =0A	See Model Number Table				mA
Input Filter	Pi filter.	All				
Inrush Current (I <sup>2</sup> t)	As per ETS300 132-2.	All			0.1	A <sup>2</sup> 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 <sub>in</sub> =24, 48V, Full Load, T <sub>c</sub> =25°C	All	-1.5		+1.5	%
Output Voltage Balance	V <sub>in</sub> =24, 48V, Full Load, T <sub>c</sub> =25°C	Dual	-1.0		+1.0	%
Output Voltage Regulation						
Load Regulation	Full Load to No Load	All			±0.5	%
Line Regulation	V <sub>in</sub> =High Line to Low Line, Full Load	All			±0.2	%
Temperature Coefficient	T <sub>c</sub> =-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			100	mV
		5Vo			100	
		Others			150	
Output Current Range	V <sub>in</sub> = 9 to 36V, 18 to 75V	See Model Number Table				A
Over Current Protection	Hiccup Mode. Auto Recovery	All	110	130	170	%
Short Circuit Protection		All	Continuous, Auto Recovery.			
External Load Capacitance	Full load (resistive)	See Model Number Table				uF
Output Voltage Trim Range	P <sub>o</sub> ≤ max rated power, I <sub>o</sub> ≤ I <sub>o,max</sub>	All	-10		+10	%



# ECLB60W Series

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Over Voltage Protection	Zener or TVS clamp	3.3Vo		3.9		V <sub>dc</sub>
		5Vo		6.2		
		12Vo		15		
		15Vo		18		
		±12Vo		±15		
		±15Vo		±18		

## EFFICIENCY

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
100% Load	V <sub>in</sub> =24V, 48V	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 <sub>o,max</sub> step load change d <sub>i</sub> /d <sub>t</sub> =0.1A/us (within 1% V <sub>out</sub> 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 <sub>on/off</sub> to 10%V <sub>o,set</sub> , Remote On	All		15		ms
Turn-On Delay Time, From Input	V <sub>in,min</sub> to 10%V <sub>o,set</sub> , Power Up	All		15		ms
Output Voltage Rise Time	10%V <sub>o,set</sub> to 90%V <sub>o,set</sub>	All		15		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			1500	V <sub>dc</sub>
	1 minute; Input to Case	All			1000	V <sub>dc</sub>
	1 minute; Output to Case	All			1000	V <sub>dc</sub>
Isolation Resistance	Input to Output	All	1000			MΩ
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 wide modulation (PWM), Fixed	Single	210	245	265	KHz
		Dual	270	300	330	
On/Off Control, Positive Remote On/Off logic, Refer to -V <sub>in</sub> pin.						
Logic Low (Module Off)	V <sub>on/off</sub> at I <sub>on/off</sub> =1.0mA	-M2	0		1.0	V
		Others	0		1.2	
Logic High (Module On)	V <sub>on/off</sub> at I <sub>on/off</sub> =0.0uA, Pin open=On	All	3.5		75	V
On/Off Control, Negative Remote On/Off logic, Refer to -V <sub>in</sub> pin						
Logic High (Module Off)	V <sub>on/off</sub> at I <sub>on/off</sub> =0.0uA, Pin open=Off	All	3.5		75	V
Logic Low (Module On)	V <sub>on/off</sub> at I <sub>on/off</sub> =1.0mA	-M2	0		1.0	V
		Others	0		1.2	
On/Off Current (for both remote on/off logic)	I <sub>on/off</sub> at V <sub>on/off</sub> =0V	All		0.3	1	mA
Leakage Current (for both remote on/off logic)	Logic High, V <sub>on/off</sub> =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		All		100		°C



# ECLB60W Series

## GENERAL SPECIFICATIONS

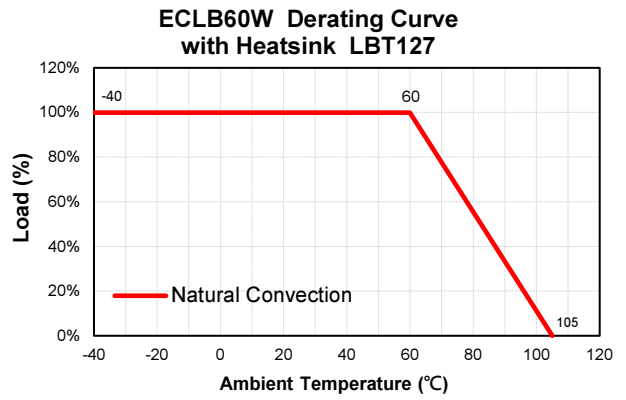
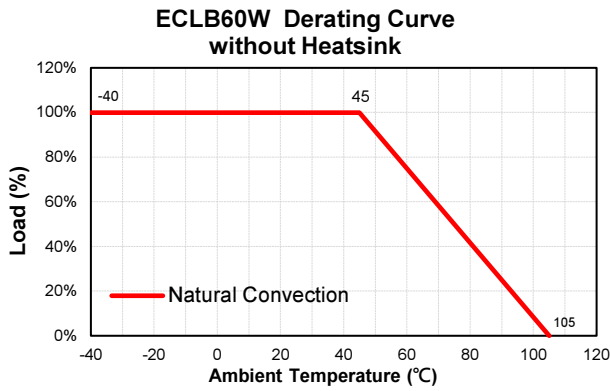
PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
MTBF	I <sub>o</sub> =100% of I <sub>o,max</sub> ; MIL-HDBK - 217F_Notice 1, GB, 25°C	3.3Vo		1116		K hours
		5Vo		872		
		12Vo		930		
		15Vo		1230		
		±12Vo		859		
		±15Vo		1063		
Weight		All		39		grams
Case Material	Aluminum, UL 94V-0					
Base plate Material	FR4					
Potting Material	UL 94V-0					
Pin Material	Base: Copper Plating: Matte Tin					
Shock/Vibration	MIL-STD-810F Compliant					
Humidity	95% RH max. Non Condensing					
Altitude	5000m Operating Altitude, 12000m Transport Altitude					
Thermal Shock	MIL-STD-810F					
Fire & Smoke	EN45545-2 Compliant					
EMI	Meets EN55032 Compliant (with external filter)					Class A
ESD	Meets EN61000-4-2	Level 3: Air ±8kV, Contact ±6kV				Perf. Criteria A
Radiated immunity	Meets EN61000-4-3	Level 3: 80~1000MHz, 20V/m				Perf. Criteria A
Fast Transient	Meets EN61000-4-4	Level 3: On power input port, ±2kV, external input capacitor required				Perf. Criteria A
Surge	Meets EN61000-4-5	Level 4: Line to earth, ±4kV, Line to line, ±2kV				Perf. Criteria A
Conducted immunity	Meets EN61000-4-6	Level 3: 0.15~80MHz, 10V				Perf. Criteria A
Application Note Link						<a href="#">ECLB60W Series App Notes</a>
Packaging Information Link						<a href="#">Packaging Information</a>



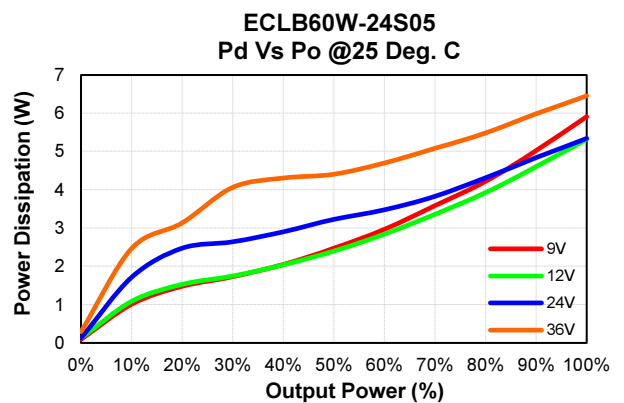
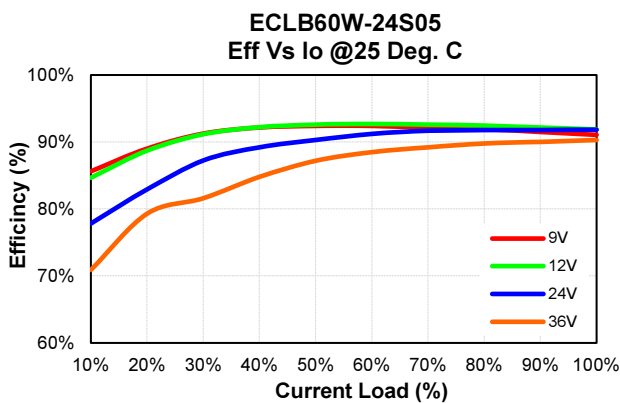
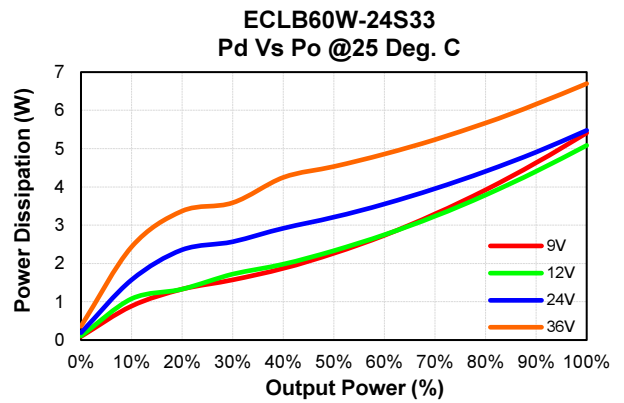
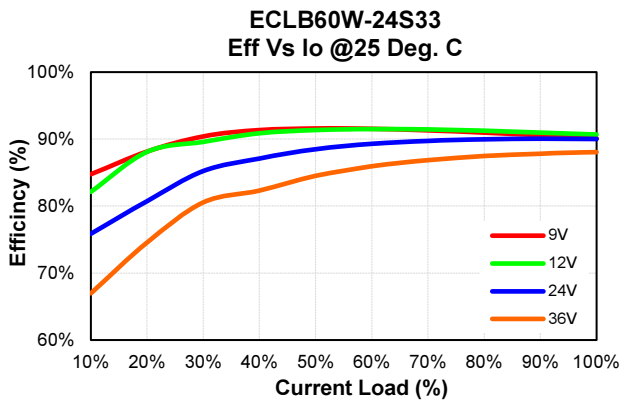
# ECLB60W Series

## CHARACTERISTIC CURVE

### Power Derating Curve



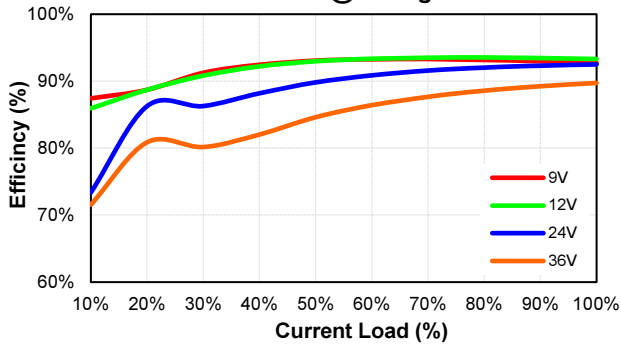
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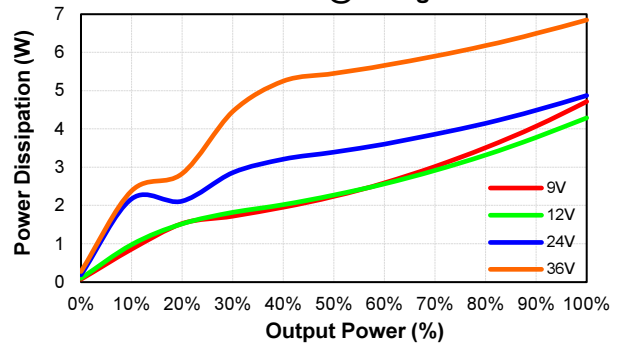


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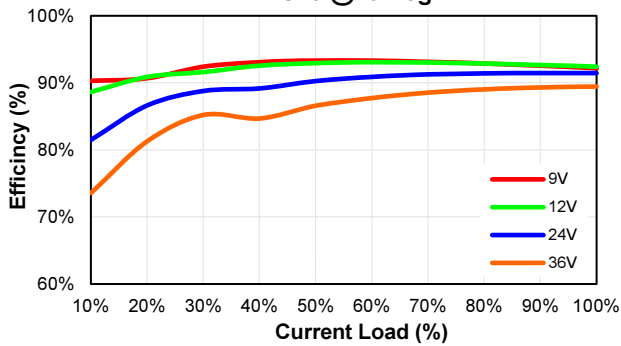
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Eff Vs Io @25 Deg. C



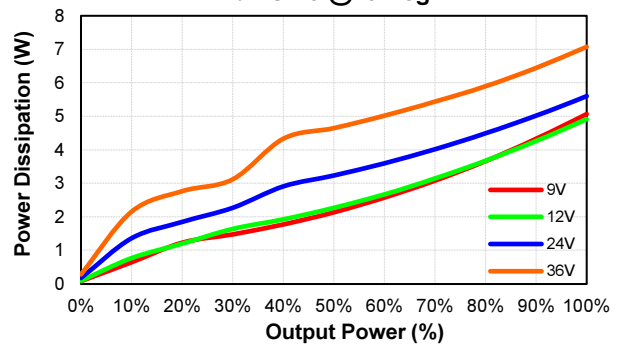
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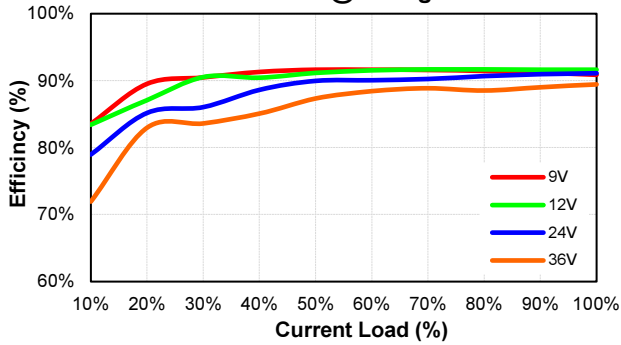
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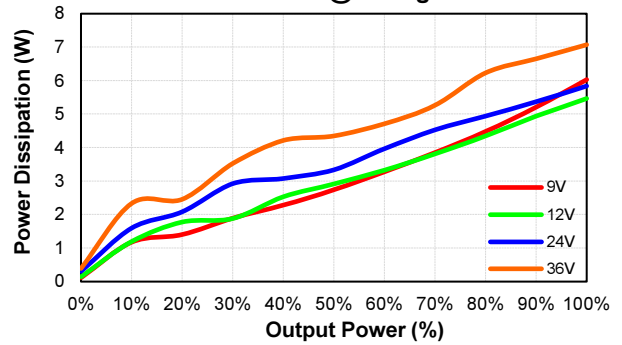
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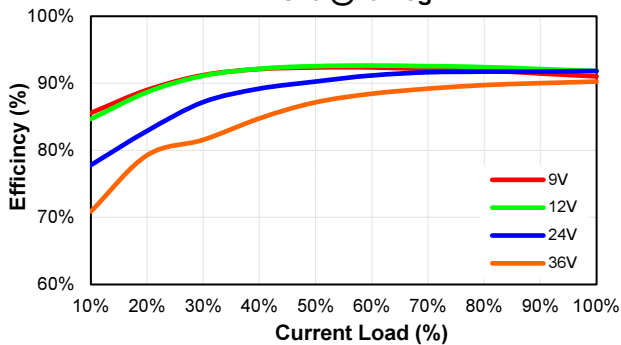
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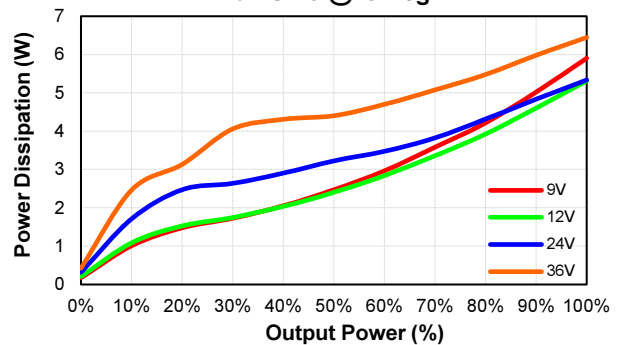
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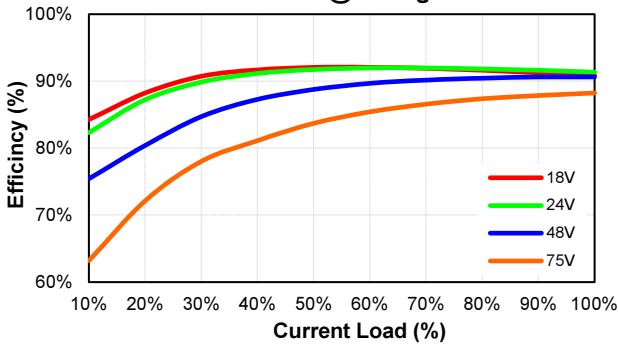
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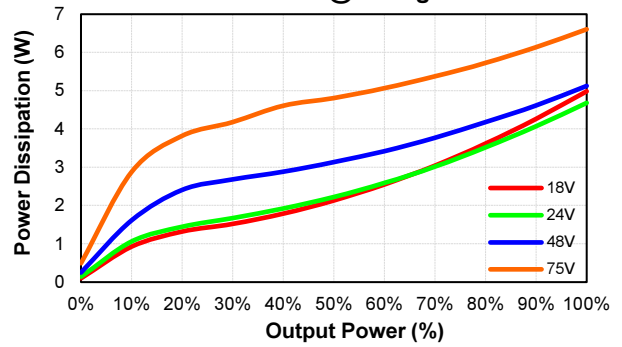


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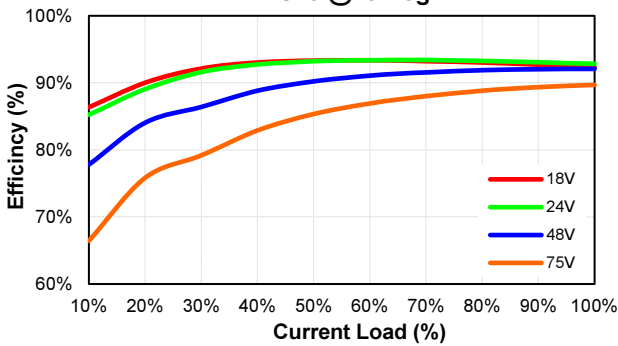
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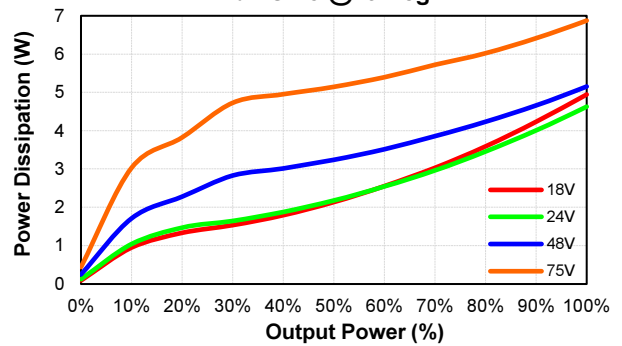
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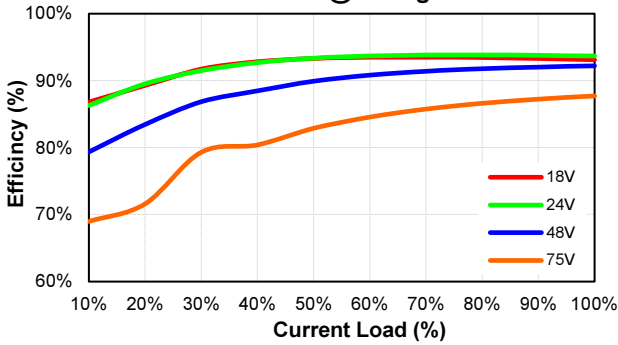
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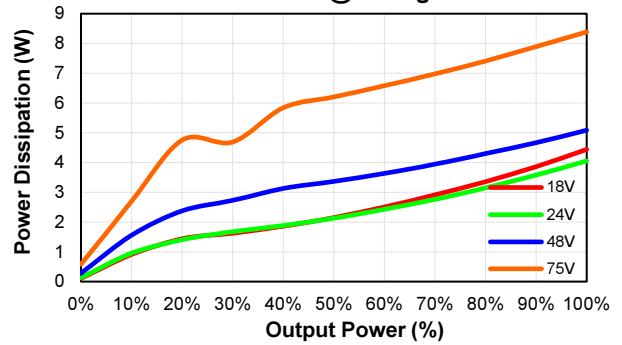
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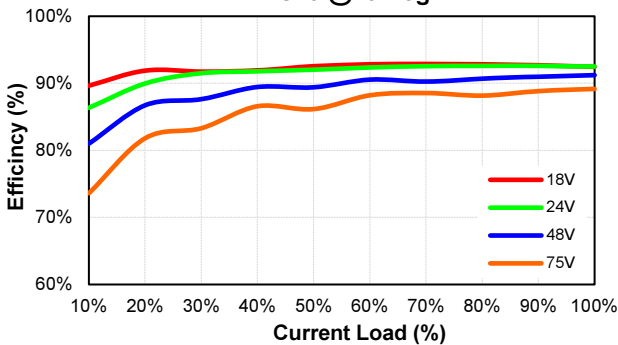
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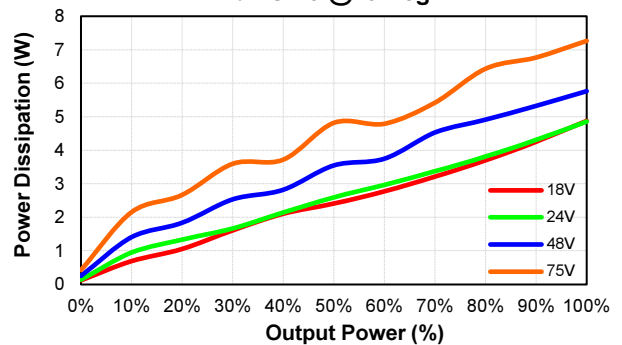
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**ECLB60W-48S15**  
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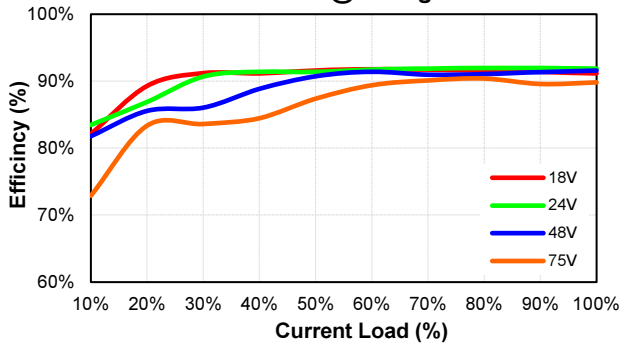
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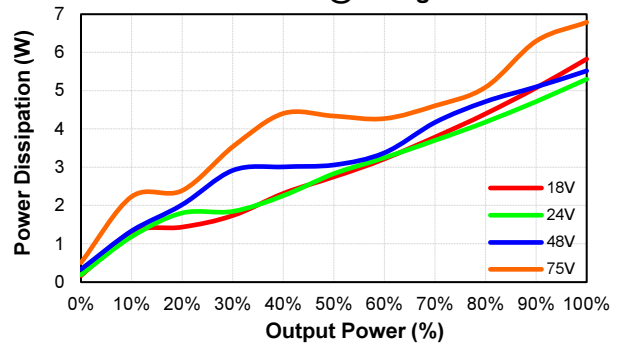


# ECLB60W Series

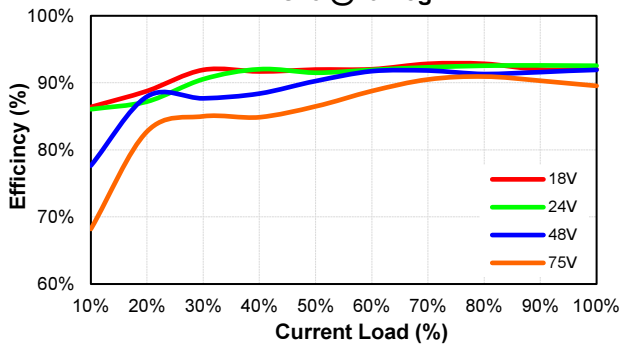
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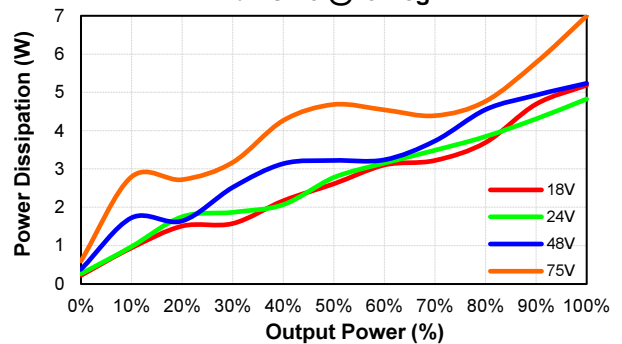
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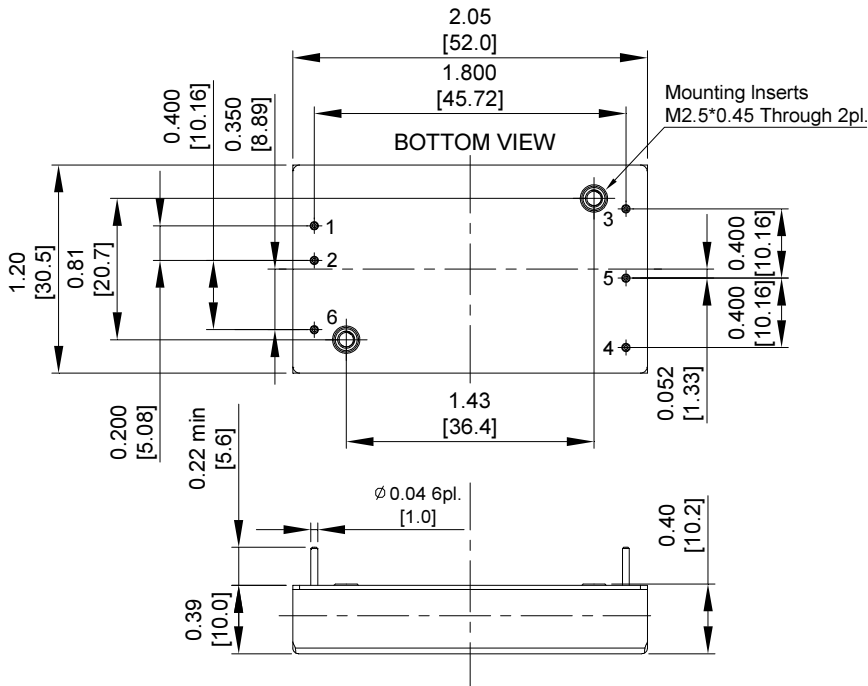
**ECLB60W-48D15**  
Eff Vs Io @25 Deg. C



**ECLB60W-48D15**  
Pd Vs Po @25 Deg. C



## 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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