

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



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 _{dc}
		48Vin	-0.3		75	
Input Surge Voltage	100ms max.	24Vin			50	V _{dc}
		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 _{dc}
		48Vin	18	48	75	
Input Under Voltage Lockout						
Turn-On Voltage Threshold		24Vin	8	8.5	8.8	V _{dc}
		48Vin	16.5	17	17.5	
Turn-Off Voltage Threshold		24Vin	7.7	8	8.3	V _{dc}
		48Vin	15.5	16	16.5	
Lockout Hysteresis Voltage		24Vin		0.5		V _{dc}
		48Vin		1		
Maximum Input Current	V _{in} =9V, Full Load.	24Vin		7.5		A
	V _{in} =18V, Full Load.	48Vin		3.8		
No-Load Input Current	V _{in} =24, 48V, 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} =24, 48V, Full Load, T _c =25°C	All	-1.5		+1.5	%
Output Voltage Balance	V _{in} =24, 48V, Full Load, T _c =25°C	Dual	-1.0		+1.0	%
Output Voltage Regulation						
Load Regulation	Full Load to No Load	All			±0.5	%
Line Regulation	V _{in} =High Line to Low Line, Full Load	All			±0.2	%
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			100	mV
		5Vo			100	
		Others			150	
Output Current Range	V _{in} = 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 _o ≤ max rated power, I _o ≤ I _{o,max}	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 _{dc}
		5Vo		6.2		
		12Vo		15		
		15Vo		18		
		±12Vo		±15		
		±15Vo		±18		

EFFICIENCY

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
100% Load	V _{in} =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 _{o,max} step load change d _i /d _t =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		15		ms
Turn-On Delay Time, From Input	V _{in,min} to 10%V _{o,set} , Power Up	All		15		ms
Output Voltage Rise Time	10%V _{o,set} to 90%V _{o,set}	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 _{dc}
	1 minute; Input to Case	All			1000	V _{dc}
	1 minute; Output to Case	All			1000	V _{dc}
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 _{in} pin.						
Logic Low (Module Off)	V _{on/off} at I _{on/off} =1.0mA	-M2	0		1.0	V
		Others	0		1.2	
Logic High (Module On)	V _{on/off} at I _{on/off} =0.0uA, Pin open=On	All	3.5		75	V
On/Off Control, Negative Remote On/Off logic, Refer to -V _{in} pin						
Logic High (Module Off)	V _{on/off} at I _{on/off} =0.0uA, Pin open=Off	All	3.5		75	V
Logic Low (Module On)	V _{on/off} at I _{on/off} =1.0mA	-M2	0		1.0	V
		Others	0		1.2	
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		All		100		°C



ECLB60W Series

GENERAL SPECIFICATIONS

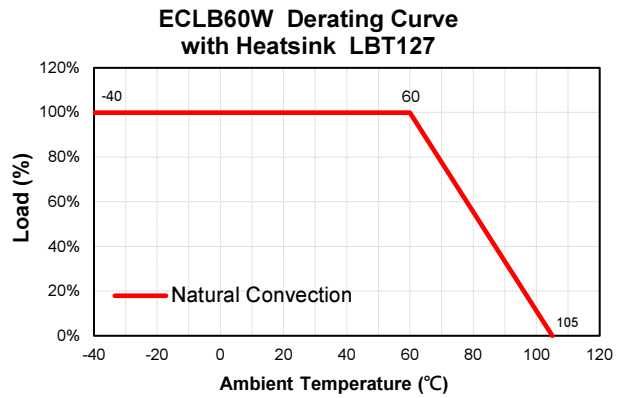
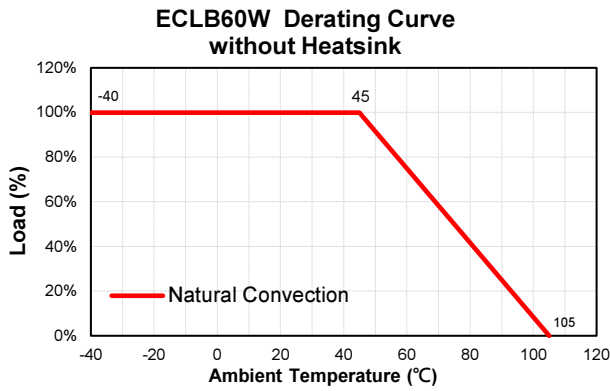
PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
MTBF	I _o =100% of I _{o,max} ; MIL-HDBK - 217F_Notice 1, GB, 25°C	3.3Vo		1116		K hours
		5Vo		872		
		12Vo		930		
		15Vo		1230		
		±12Vo		859		
		±15Vo		1063		
Weight		All		39		grams
Case Material	Aluminum, UL 94V-0					
Base plate Material	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						ECLB60W Series App Notes
Packaging Information Link						Packaging Information



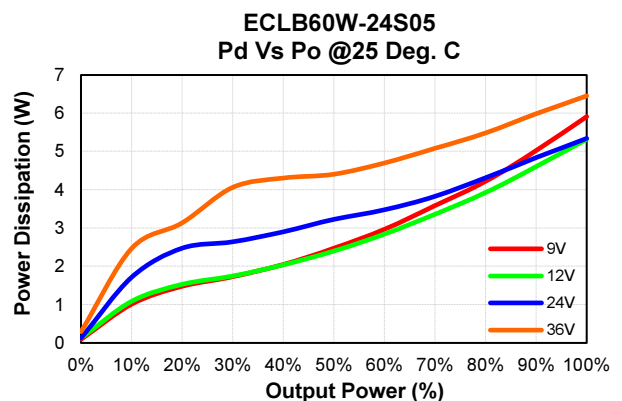
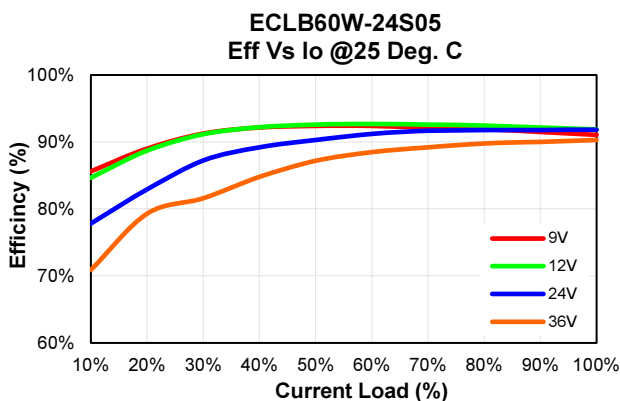
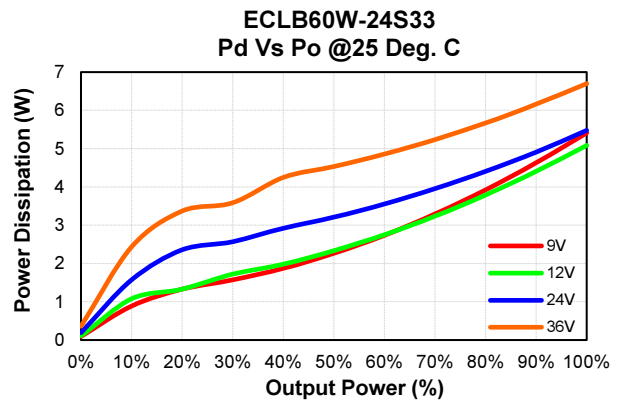
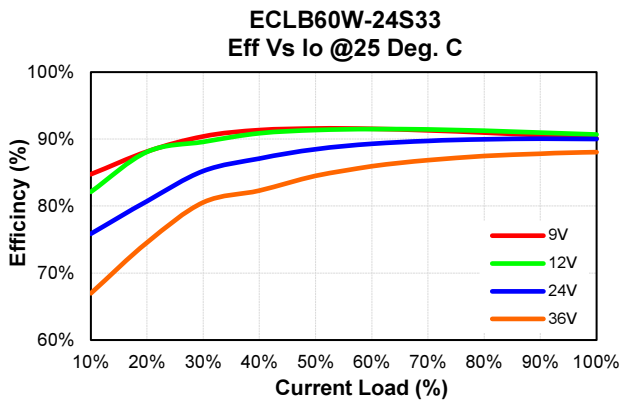
ECLB60W Series

CHARACTERISTIC CURVE

Power Derating Curve



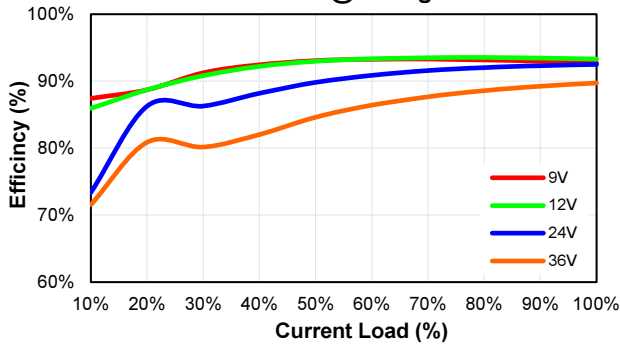
Performance Data



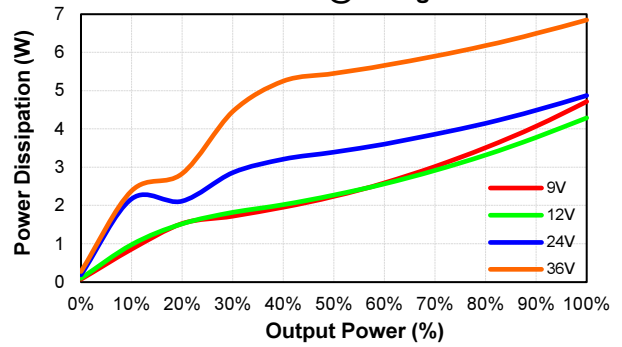


ECLB60W Series

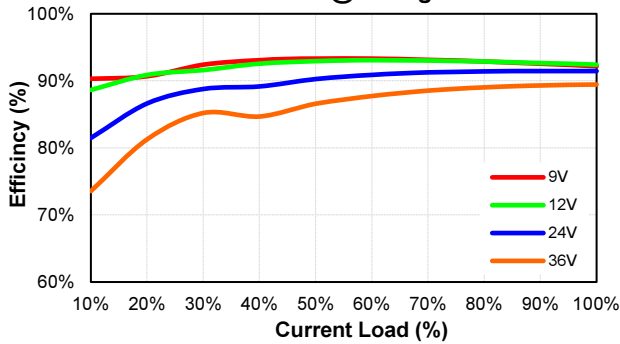
ECLB60W-24S12
Eff Vs Io @25 Deg. C



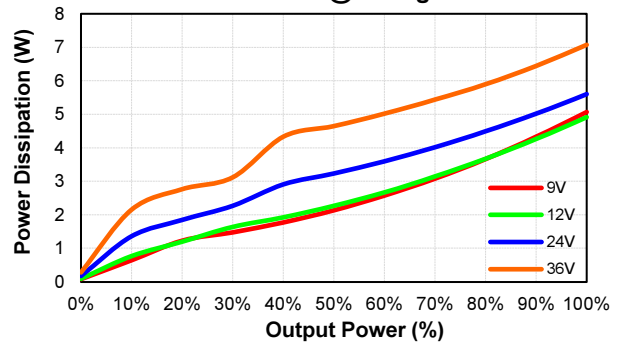
ECLB60W-24S12
Pd Vs Po @25 Deg. C



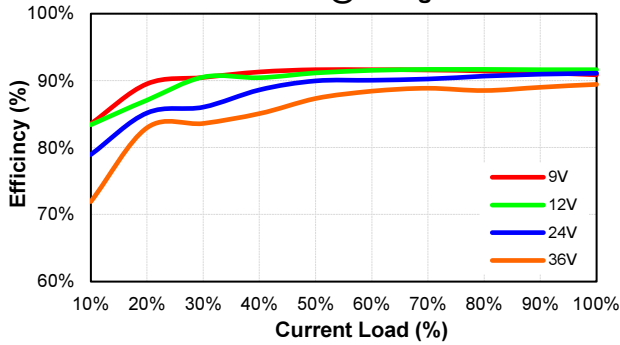
ECLB60W-24S15
Eff Vs Io @25 Deg. C



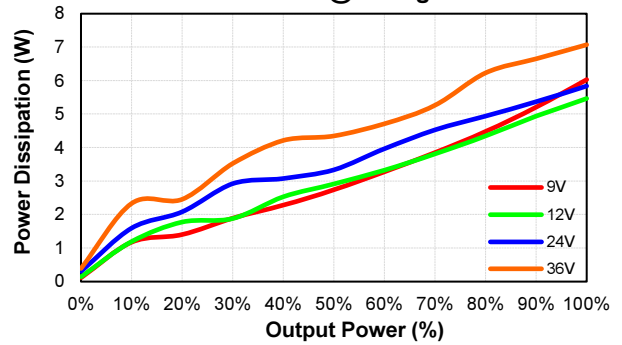
ECLB60W-24S15
Pd Vs Po @25 Deg. C



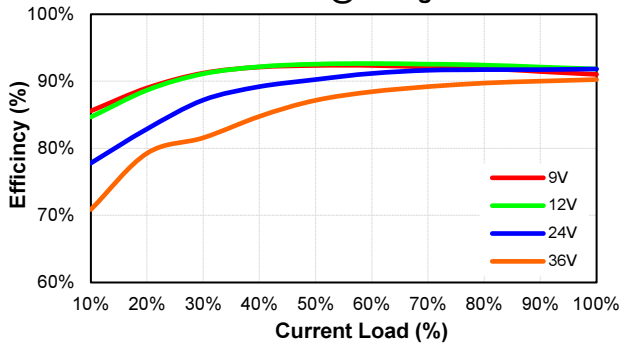
ECLB60W-24D12
Eff Vs Io @25 Deg. C



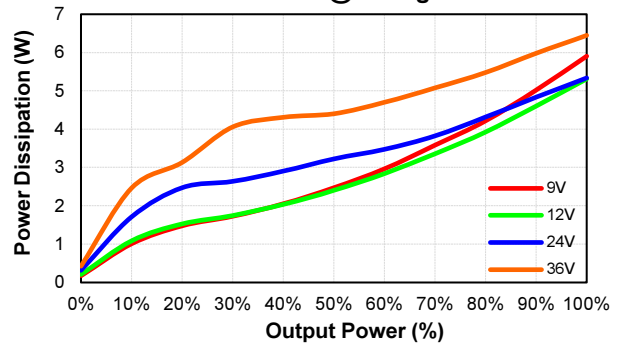
ECLB60W-24D12
Pd Vs Po @25 Deg. C



ECLB60W-24D15
Eff Vs Io @25 Deg. C



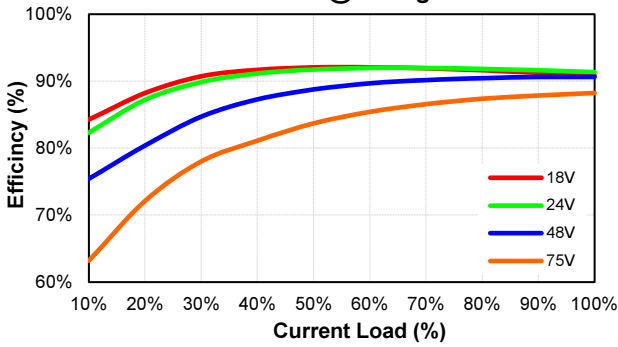
ECLB60W-24D15
Pd Vs Po @25 Deg. C



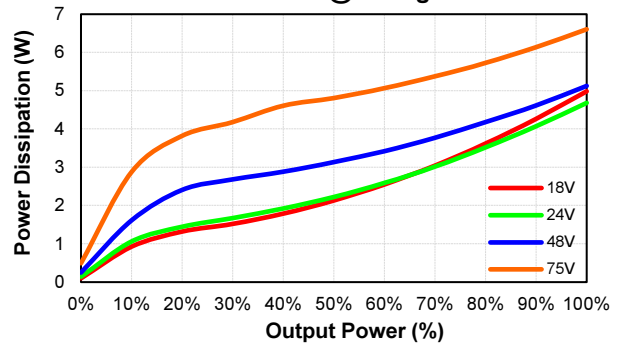


ECLB60W Series

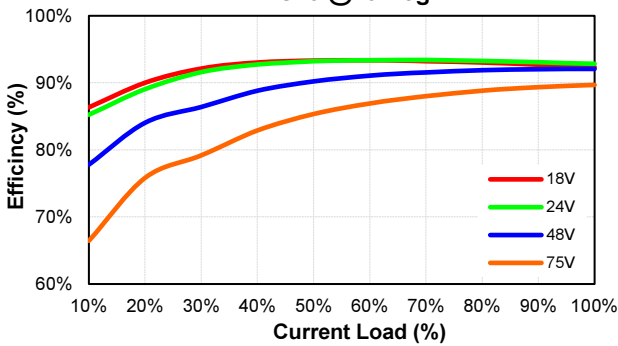
ECLB60W-48S33
Eff Vs Io @25 Deg. C



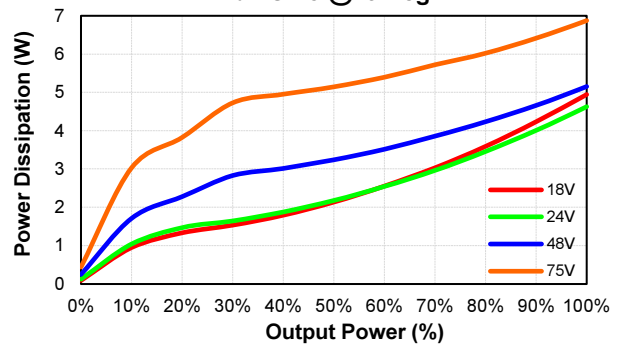
ECLB60W-48S33
Pd Vs Po @25 Deg. C



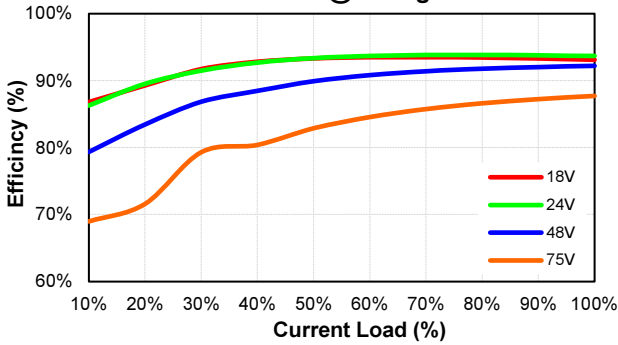
ECLB60W-48S05
Eff Vs Io @25 Deg. C



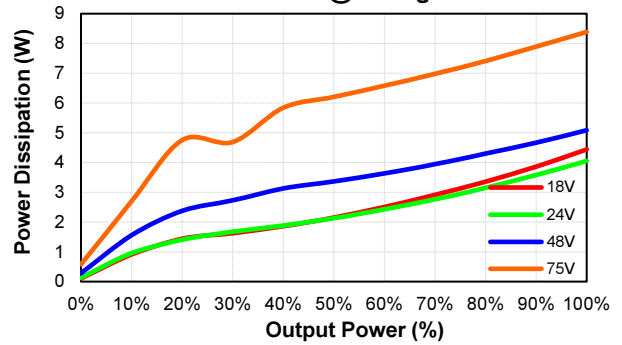
ECLB60W-48S05
Pd Vs Po @25 Deg. C



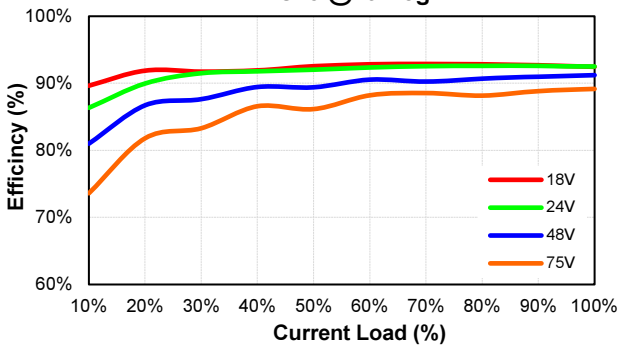
ECLB60W-48S12
Eff Vs Io @25 Deg. C



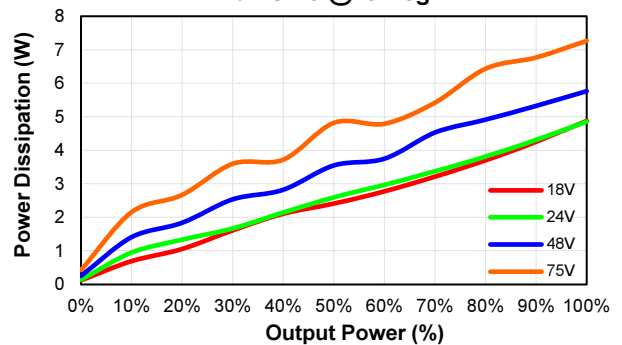
ECLB60W-48S12
Pd Vs Po @25 Deg. C



ECLB60W-48S15
Eff Vs Io @25 Deg. C



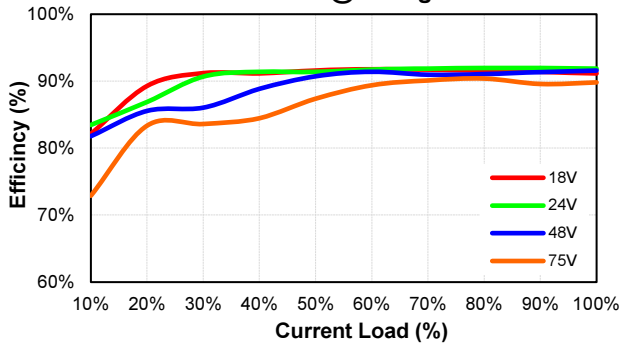
ECLB60W-48S15
Pd Vs Po @25 Deg. C



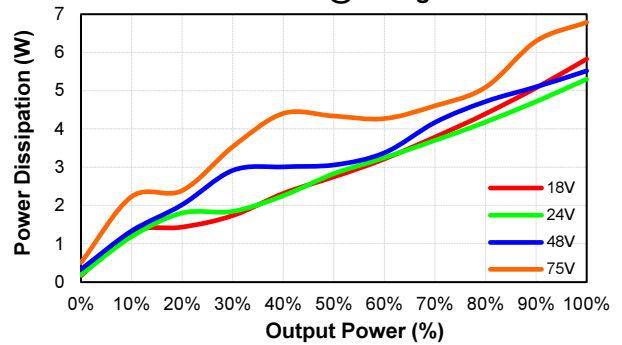


ECLB60W Series

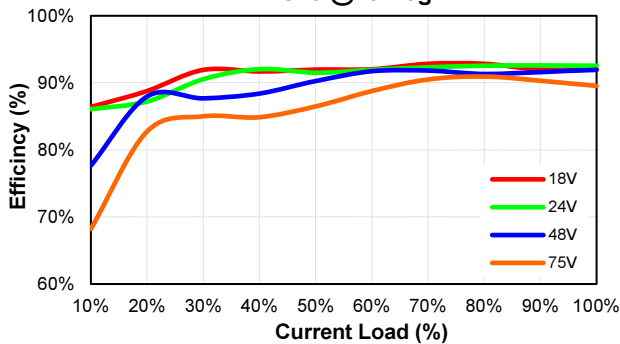
ECLB60W-48D12
Eff Vs Io @25 Deg. C



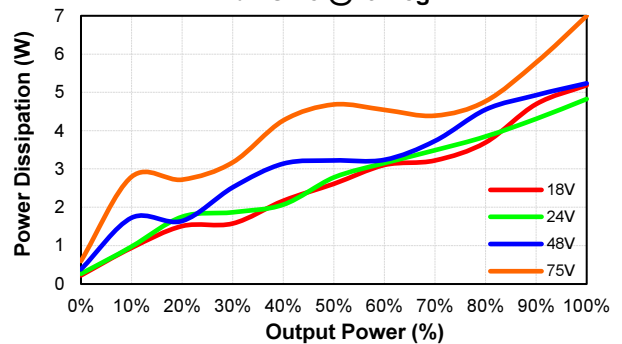
ECLB60W-48D12
Pd Vs Po @25 Deg. C



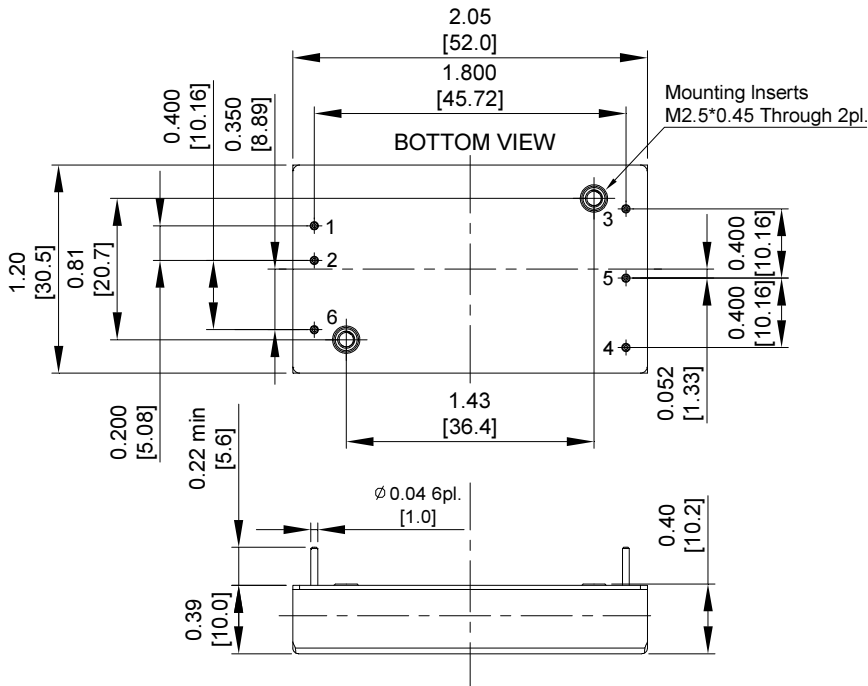
ECLB60W-48D15
Eff Vs Io @25 Deg. C



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