



EC4DAW SERIES 6 WATT 4:1 INPUT ISOLATED DC-DC CONVERTER

Features

- Efficiency Up to 87%
- Fixed Switching Frequency
- Regulated Outputs
- Negative Remote On/Off
- 3000Vdc I/O Isolation
- Continuous Short Circuit Protection
- Safety Meets IEC/EN/UL 62368-1
- Shock & Vibration MIL-STD-810F Compliant



MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT		INPUT CURRENT		% EFF.		CAPACITOR LOAD MAX.
			MIN.	MAX.	NO LOAD	FULL LOAD	(3)	(2)	
EC4DAW-24S33N	9-36 VDC	3.3 VDC	0 mA	1500 mA	5 mA	258 mA	81	80	4700 uF
EC4DAW-24S05N	9-36 VDC	5 VDC	0 mA	1200 mA	6 mA	303 mA	83.5	82.5	2200 uF
EC4DAW-24S12N	9-36 VDC	12 VDC	0 mA	500 mA	6 mA	289 mA	87	86.5	1100 uF
EC4DAW-24S15N	9-36 VDC	15 VDC	0 mA	400 mA	7 mA	291 mA	87	86	470 uF
EC4DAW-24D12N	9-36 VDC	±12 VDC	0 mA	±250 mA	9 mA	291 mA	86	86	660 uF
EC4DAW-24D15N	9-36 VDC	±15 VDC	0 mA	±200 mA	9 mA	294 mA	85.5	85	220 uF
EC4DAW-48S33N	18-74 VDC	3.3 VDC	0 mA	1500 mA	4 mA	128 mA	80.5	80.5	4700 uF
EC4DAW-48S05N	18-74 VDC	5 VDC	0 mA	1200 mA	4 mA	153 mA	82	82	2200 uF
EC4DAW-48S12N	18-74 VDC	12 VDC	0 mA	500 mA	5 mA	144 mA	87	87	1100 uF
EC4DAW-48S15N	18-74 VDC	15 VDC	0 mA	400 mA	5 mA	146 mA	87	86	470 uF
EC4DAW-48D12N	18-74 VDC	±12 VDC	0 mA	±250 mA	5 mA	144 mA	87	87	660 uF
EC4DAW-48D15N	18-74 VDC	±15 VDC	0 mA	±200 mA	5 mA	146 mA	86.5	86	220 uF

NOTE:

1. Nominal Input Voltage 24 or 48VDC.
2. Measured at Nominal Input Voltage.
3. Measured at 12VDC for 24V_{in}, 24VDC for 48V_{in}.

PART NUMBER

Series	Nominal Input Voltage	Number of Outputs	Nominal Output Voltage	Remote On/Off Logic
EC4DAW	II	O	XX	Y
EC4DAW	24 : 24 VDC 48 : 48 VDC	S : Single D : Dual	33 : 3.3VDC 05 : 5.0VDC 12 : 12VDC 15 : 15VDC	N : Negative

Part Number Example:

EC4DAW-24S12N: 6W, 4:1 9-36V_{dc} Input, Single 12V_{dc} Output, Negative Logic



EC4DAW 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	24V _{in} 48V _{in}	-0.3 -0.3		36 74	V _{dc}
Input Surge Voltage	100ms max.	24V _{in} 48V _{in}			50 100	V _{dc}
Operating Temperature	With de-rating, above 61°C	V _o =3.3V V _o =5V	-40		105	°C
	With de-rating, above 65°C	V _o =12V V _o =15V V _o =±12V V _o =±15V				
Maximum Case Temperature	At the center part of case plate	All			105	°C
Storage Temperature		All	-55		125	°C

INPUT CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Operating Input Voltage		24V _{in} 48V _{in}	9 18	24 48	36 74	V _{dc}
Maximum Input Current	V _{in} =9V, Full load V _{in} =18V, Full load	24V _{in} 48V _{in}		0.8 0.4		A
No-Load Input Current	V _{in} =24, 48V, I _o =0A	See Model Number Table				mA
Input Filter	Pi type	All				
Inrush Current (I _{2t})	As per ETS300 132-2	All			0.1	A ² s
Input Reflected Ripple Current	V _{in} =nominal, L=12uH, C=47uF, Load=full load	All		10		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	Single			±0.2	%
		Dual			±0.5	%
Cross Regulation	Asymmetrical load 25%/100%	Dual			±5.0	%
Temperature Coefficient	T _c =-40°C to 85°C	All			±0.03	%/°C
Output Voltage Ripple and Noise (5Hz to 20MHz bandwidth)						
Peak-to-Peak	Full load, T _c =25°C 1uF ceramic capacitor	XXS15N Others			120 100	mV
Output Current Range	V _{in} = 9 to 36V, 18 to 74V	See Model Number Table				A
Over Current Protection	Hiccup mode. Auto recovery	All		180		%
Short Circuit Protection		All	Continuous, Auto Recovery			
External Load Capacitance	Full load (resistive)	See Model Number Table				uF

EFFICIENCY

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
100% Load	V _{in} =24V, 48V	See Model Number Table				%



EC4DAW Series

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		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		8		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_{dc}
Isolation Resistance	Input to output	All	1000			M Ω
Isolation Capacitance	Input to output	All		500		pF

FEATURE CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Switching Frequency	Pulse width modulation (PWM), fixed	All		580		KHz
On/Off Control, Negative Remote On/Off Logic, Refer to -Vin Pin						
Logic High (Module Off)	$V_{on/off}$ at $I_{on/off}$	All	2		4	mA
Logic Low (Module On)	Pin open=on, high impedance	All				
Off Converter Input Current	Shutdown input idle current	All			2.5	mA

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	24S33		4650		K hours
		24S05		4136		
		24S12		3920		
		24S15		4382		
		24D12		3302		
		24D15		3851		
		48S33		4675		
		48S05		4132		
		48S12		3899		
		48S15		4671		
		48D12		3387		
		48D15		4278		
Weight		All		6.5		grams
Case Material	Non-Conductive Black Plastic, UL 94V-0					
Potting Material	UL 94V-0					
Pin Material	Base: Copper with Steel Plating: Bright Tin					
Shock/Vibration	MIL-STD-810F Compliant					
Humidity	95% RH max. Non condensing					
Altitude	2000m Operating altitude, 12000m Transport altitude					
Thermal Shock	MIL-STD-810F					



EC4DAW Series

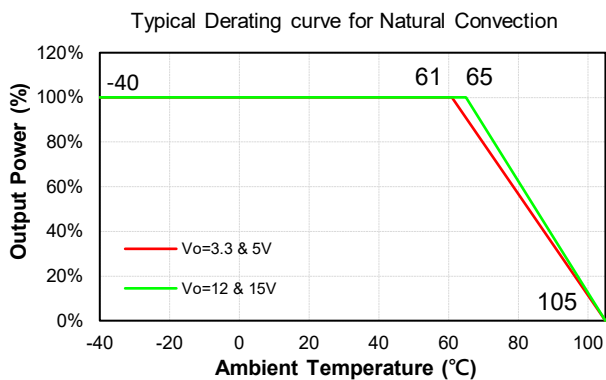
GENERAL SPECIFICATIONS

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

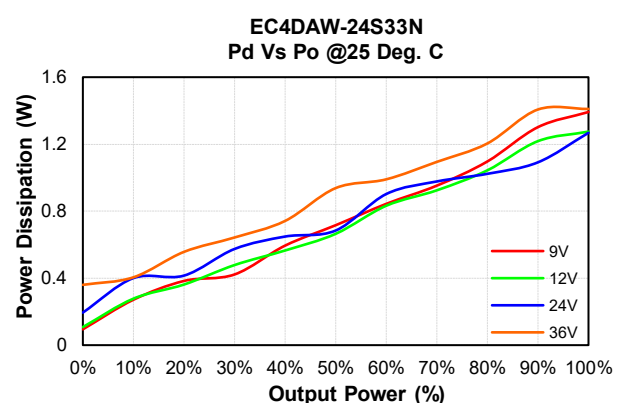
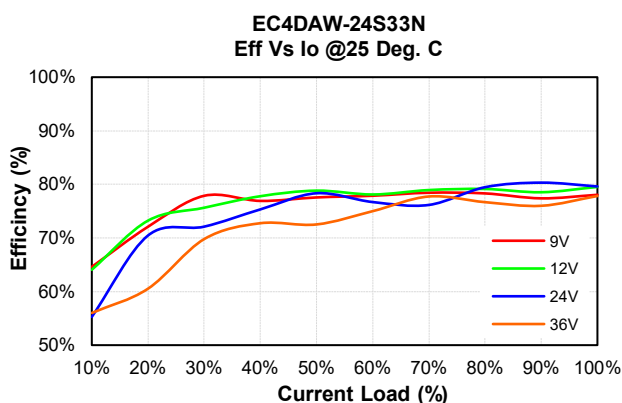
EMI	Meets EN 55032 (with external filter)	Class A
ESD	Meets EN 61000-4-2 Level 2: Air $\pm 8\text{kV}$, Contact $\pm 4\text{kV}$	Perf. Criteria A
Radiated immunity	Meets EN 61000-4-3 Level 2: 80~1000MHz, 3V/m	Perf. Criteria A
Fast Transient	Meets EN 61000-4-4 Level 2: On power input port, $\pm 0.5\text{kV}$, external input capacitor required	Perf. Criteria A
Surge	Meets EN 61000-4-5 Level 2: Line to earth, $\pm 1\text{kV}$, Line to line, $\pm 0.5\text{kV}$, external input capacitor required	Perf. Criteria A
Conducted immunity	Meets EN 61000-4-6 Level 2: 0.15~80MHz, 3V	Perf. Criteria A
Application Note Link		EC4DAW Series App Notes
Packaging Information Link		Packaging Information

CHARACTERISTIC CURVE

Power Derating Curve



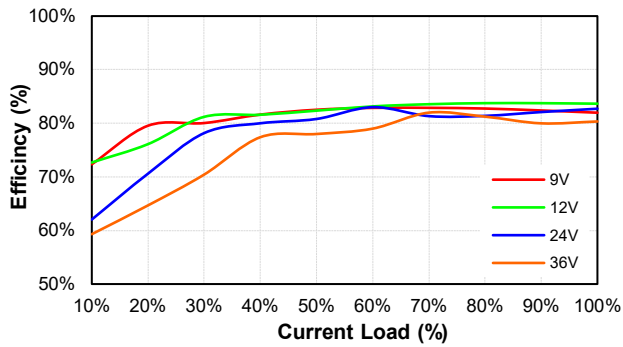
Performance Data



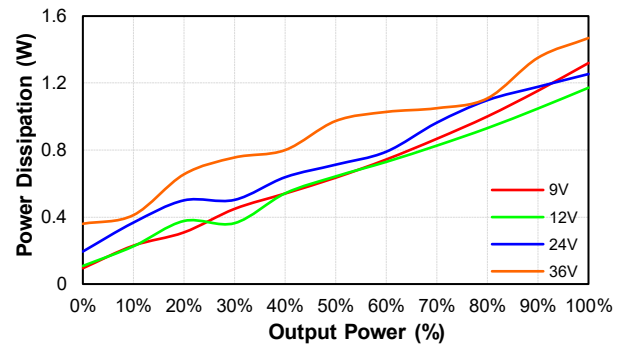


EC4DAW Series

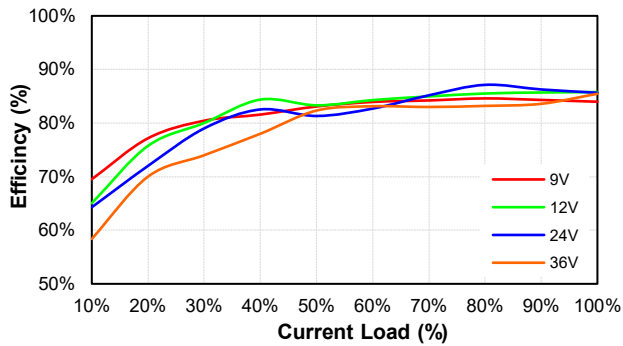
EC4DAW-24S05N
Eff Vs Io @25 Deg. C



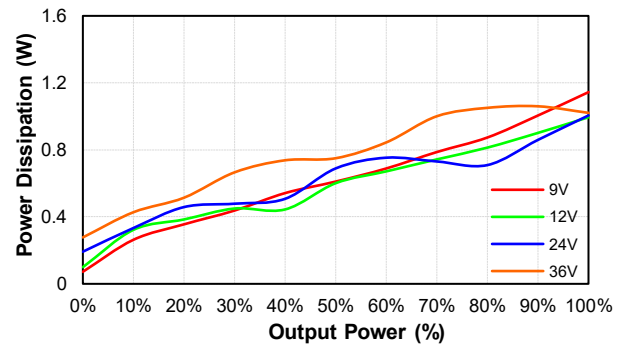
EC4DAW-24S05N
Pd Vs Po @25 Deg. C



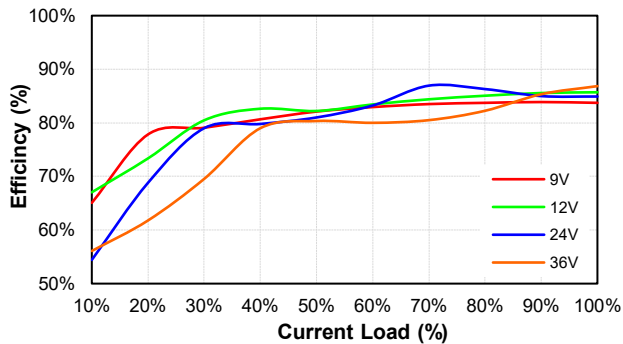
EC4DAW-24S12N
Eff Vs Io @25 Deg. C



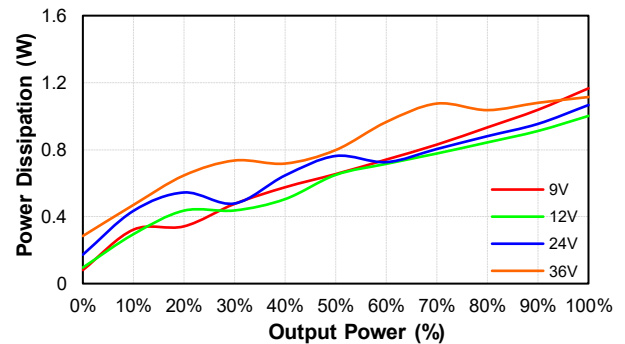
EC4DAW-24S12N
Pd Vs Po @25 Deg. C



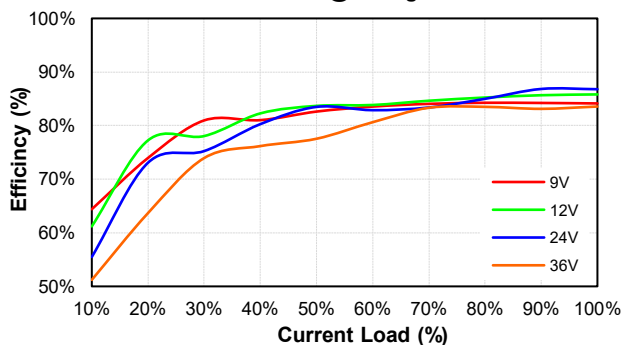
EC4DAW-24S15N
Eff Vs Io @25 Deg. C



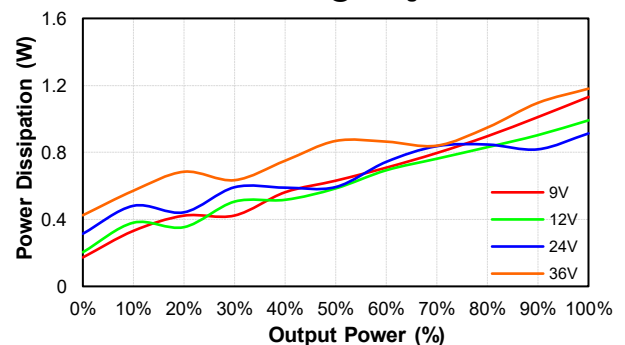
EC4DAW-24S15N
Pd Vs Po @25 Deg. C



EC4DAW-24D12N
Eff Vs Io @25 Deg. C



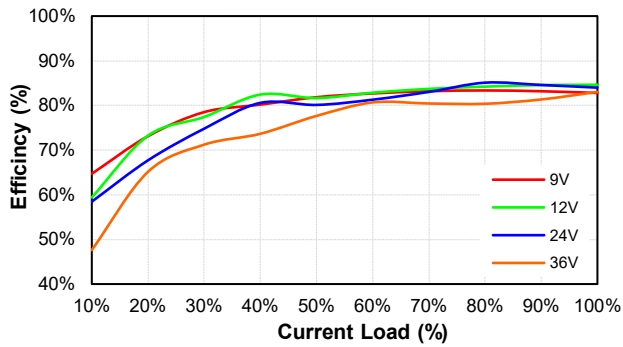
EC4DAW-24D12N
Pd Vs Po @25 Deg. C



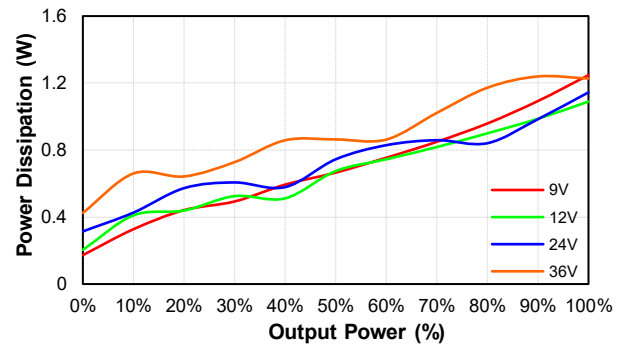


EC4DAW Series

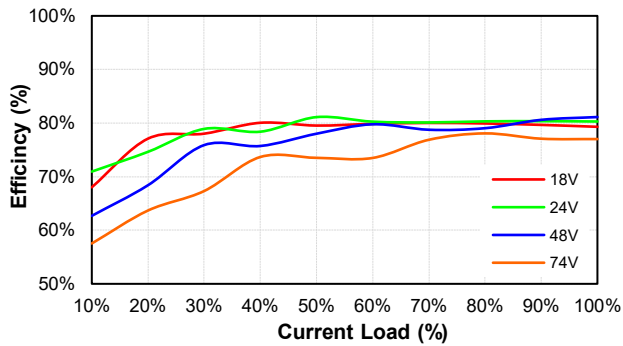
EC4DAW-24D15N
Eff Vs Io @25 Deg. C



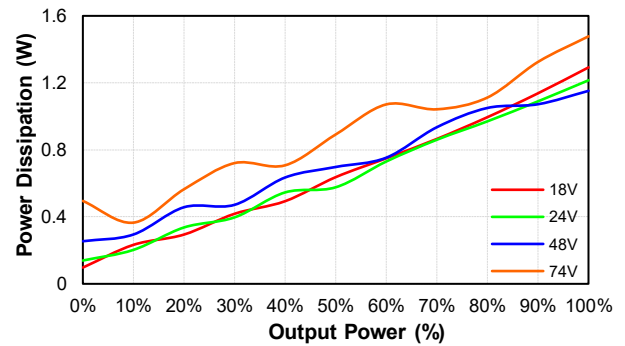
EC4DAW-24D15N
Pd Vs Po @25 Deg. C



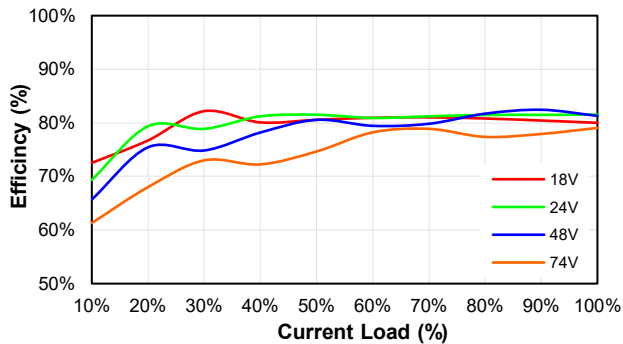
EC4DAW-48S33N
Eff Vs Io @25 Deg. C



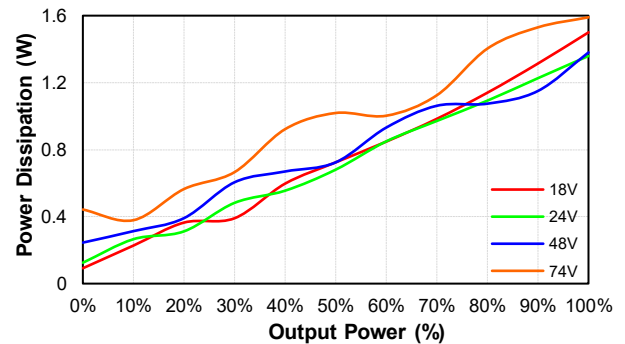
EC4DAW-48S33N
Pd Vs Po @25 Deg. C



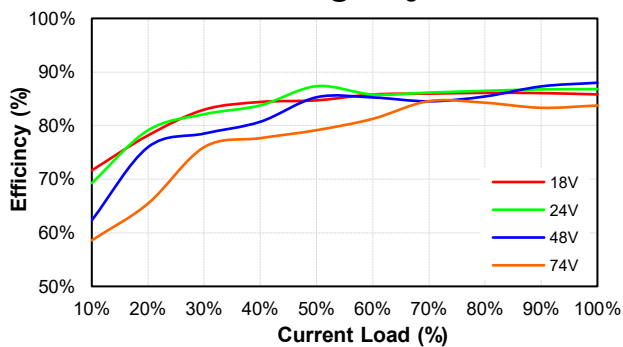
EC4DAW-48S05N
Eff Vs Io @25 Deg. C



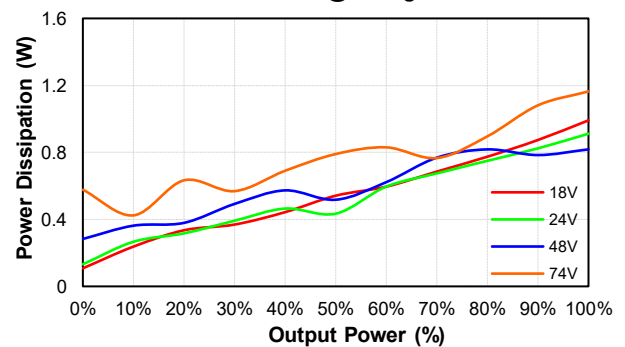
EC4DAW-48S05N
Pd Vs Po @25 Deg. C



EC4DAW-48S12N
Eff Vs Io @25 Deg. C



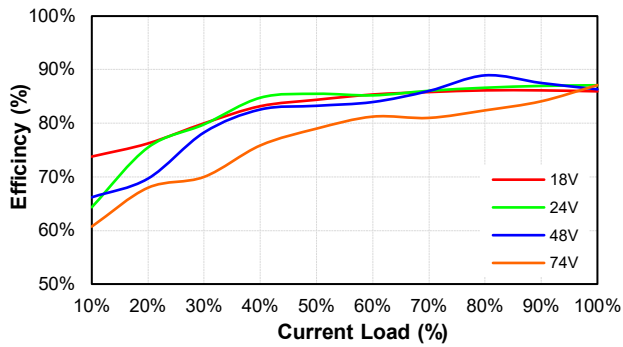
EC4DAW-48S12N
Pd Vs Po @25 Deg. C



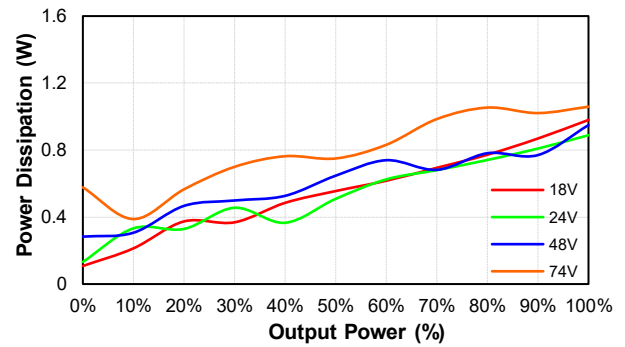


EC4DAW Series

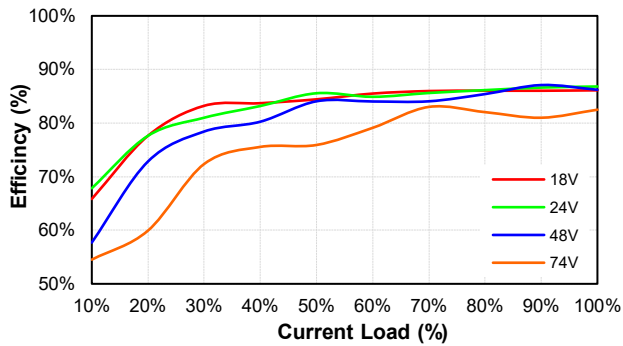
EC4DAW-48S15N
Eff Vs Io @25 Deg. C



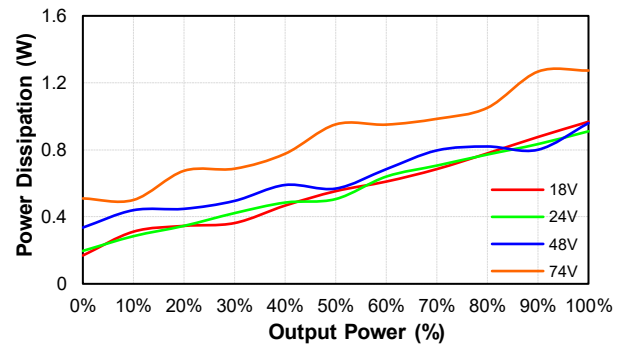
EC4DAW-48S15N
Pd Vs Po @25 Deg. C



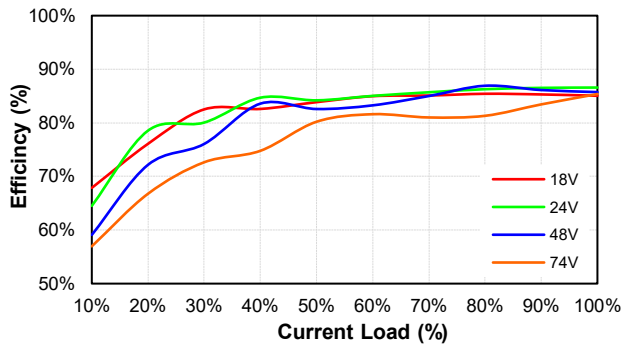
EC4DAW-48D12N
Eff Vs Io @25 Deg. C



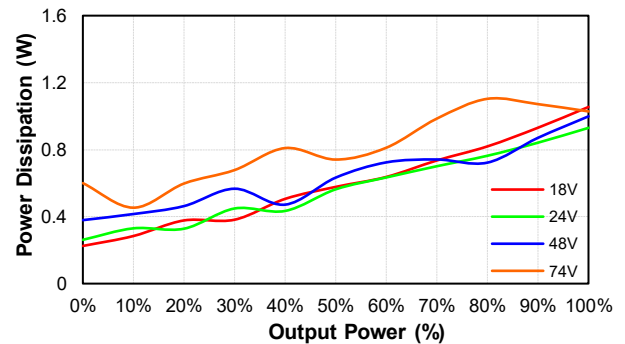
EC4DAW-48D12N
Pd Vs Po @25 Deg. C



EC4DAW-48D15N
Eff Vs Io @25 Deg. C



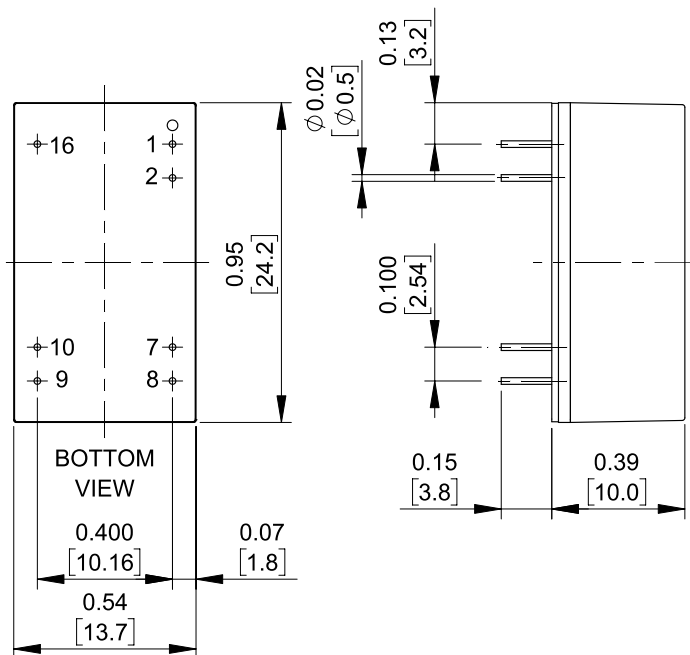
EC4DAW-48D15N
Pd Vs Po @25 Deg. C





EC4DAW Series

MECHANICAL SPECIFICATION



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	Single	Dual
1	-V Input	-V Input
2	Remote	Remote
7	NC	NC
8	NC	Common
9	+V Output	+V Output
10	-V Output	-V Output
16	+V Input	+V Input

Note: Pin Size is $\phi 0.02 \pm 0.002$ Inch [$\phi 0.5 \pm 0.05$ mm]

NC-No Connection with Pin