



# EC3SAWH SERIES 3 WATT 4:1 INPUT ISOLATED DC-DC CONVERTER

## Features

- Efficiency Up to 84.5%
- Regulated Outputs
- Positive Remote On/Off
- 3000Vdc I/O Isolation
- Continuous Short Circuit Protection
- Input Under Voltage 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		
EC3SAW-24S33HP	9-36 VDC	3.3 VDC	0 mA	700 mA	6 mA	123 mA	78	1800uF
EC3SAW-24S05HP	9-36 VDC	5 VDC	0 mA	600 mA	4 mA	154 mA	81	1000uF
EC3SAW-24S12HP	9-36 VDC	12 VDC	0 mA	250 mA	14 mA	151 mA	83	220uF
EC3SAW-24S15HP	9-36 VDC	15 VDC	0 mA	200 mA	15 mA	152 mA	82.5	120uF
EC3SAW-24D05HP	9-36 VDC	±5 VDC	0 mA	±300 mA	8 mA	155 mA	80.5	470uF
EC3SAW-24D12HP	9-36 VDC	±12 VDC	0 mA	±125 mA	25 mA	150 mA	83.5	100uF
EC3SAW-24D15HP	9-36 VDC	±15 VDC	0 mA	±100 mA	28 mA	152 mA	82	47uF
EC3SAW-48S33HP	18-74 VDC	3.3 VDC	0 mA	700 mA	3 mA	61 mA	79	1800uF
EC3SAW-48S05HP	18-74 VDC	5 VDC	0 mA	600 mA	3 mA	76 mA	82	1000uF
EC3SAW-48S12HP	18-74 VDC	12 VDC	0 mA	250 mA	7 mA	74 mA	84.5	220uF
EC3SAW-48S15HP	18-74 VDC	15 VDC	0 mA	200 mA	12 mA	74 mA	84	120uF
EC3SAW-48D05HP	18-74 VDC	±5 VDC	0 mA	±300 mA	5 mA	76 mA	82	470uF
EC3SAW-48D12HP	18-74 VDC	±12 VDC	0 mA	±125 mA	12 mA	74 mA	84	100uF
EC3SAW-48D15HP	18-74 VDC	±15 VDC	0 mA	±100 mA	13 mA	75 mA	83	47uF

NOTE:

1. Nominal Input Voltage 24 or 48VDC

## PART NUMBER

Series	Nominal Input Voltage	Number of Outputs	Nominal Output Voltage	Isolation Voltage	Remote On/Off Logic
EC3SAW	II	O	XX	L	Y
EC3SAW	24: 24 VDC 48: 48 VDC	S: Single D: Dual	33: 3.3VDC 05: 5.0VDC 12: 12VDC 15: 15VDC	H: 3000Vdc	P: Positive

Part Number Example:

**EC3SAW-24S12HP:** 3W, 4:1 9-36Vdc Input, Single 12Vdc Output, 3000VDC Isolation, Positive Logic



# EC3SAWH 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		74	
Input Surge Voltage	100ms max.	24Vin			50	V <sub>dc</sub>
		48Vin			100	
Operating Ambient Temperature	With de-rating, above 68°C	24S(D)05HP	-40		85	°C
	With de-rating, above 71°C	Others				
Maximum Case Temperature	At the center part of case plate	All			100	°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	74	
Under Voltage Protection						
Turn-On Voltage Threshold		24Vin			7.5	V <sub>dc</sub>
		48Vin			15.5	
Turn-Off Voltage Threshold		24Vin	6			V <sub>dc</sub>
		48Vin	12			
Maximum Input Current	V <sub>in</sub> =9V, Full load.	24Vin		427		mA
	V <sub>in</sub> =18V, Full load	48Vin		213		
No-Load Input Current	V <sub>in</sub> =24, 48V, I <sub>o</sub> =0A	See Model Number Table				mA
Input Filter	Capacitive	All				
Inrush Current (I <sup>2</sup> t)	As per ETS300 132-2.	All			0.01	A <sup>2</sup> s
Input Reflected Ripple Current	V <sub>in</sub> =Nominal, L=12uH, C=33uF, Load=Full load	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 10% load	Single			±0.5	%
		Dual			±1.0	
Line Regulation	V <sub>in</sub> =High line to low line, full load	All			±0.5	%
Cross Regulation	Asymmetrical load 25%/100%	Dual			±5	%
Temperature Coefficient	T <sub>c</sub> =-40°C to 85°C	All			±0.03	%/°C
Output Voltage Ripple and Noise (5Hz to 20MHz bandwidth)						
Peak-to-Peak	Full load, T <sub>c</sub> =25°C, With 0.1uF MLCC across output and Y-cap 470pF	All			50	mV
Output Current Range	V <sub>in</sub> = 9 to 36V, 18 to 74V	See Model Number Table				A
Over Current Protection	Foldback mode. Auto recovery	All	120			%
Short Circuit Protection		All	Continuous, Auto Recovery			
External Load Capacitance	Full load (resistive)	See Model Number Table				uF



# EC3SAWH Series

## 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/d <sub>t</sub> =0.1A/us (within 1% V <sub>out</sub> nominal)	All			±6	%
Recovery Time		All			500	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		1	2	ms
Turn-On Delay Time, From Input	V <sub>in,min</sub> to 10%V <sub>o,set</sub> , Power up	All		1	2	ms
Output Voltage Rise Time	10%V <sub>o,set</sub> to 90%V <sub>o,set</sub>	All		1.5	3	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 <sub>dc</sub>
Isolation Resistance	Input to output	All	1000			MΩ
Isolation Capacitance	Input to output	All		45		pF

## FEATURE CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Switching Frequency	Pulse frequency modulation (PFM)	All	100			KHz
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	All	0		1.2	V
Logic High (Module On)	Pin open=On, high impedance	All				
Off Converter Input Current	Shutdown input idle current	All			1	mA

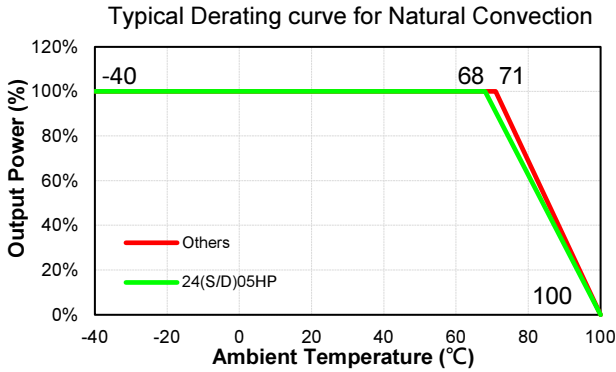
## GENERAL SPECIFICATIONS

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	Single Dual		2.8 2.1		M hours
Weight		All		4.8		grams
Case Material	Non-Conductive Black Plastic, UL 94V-0					
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	2000m Operating Altitude, 12000m Transport Altitude					
Thermal Shock	MIL-STD-810F					
EMI	Meets EN55032 (with external filter)				Class A	
ESD	Meets EN61000-4-2 Level 2: Air ±8kV, Contact ±4kV				Perf. Criteria A	
Radiated immunity	Meets EN61000-4-3 Level 2: 80~1000MHz, 3V/m				Perf. Criteria A	
Fast Transient	Meets EN61000-4-4 Level 2: On power input port, ±0.5kV, external input TVS required				Perf. Criteria A	
Surge	Meets EN61000-4-5 Level 2: Line to line, ±0.5kV, external input TVS required				Perf. Criteria A	
Conducted immunity	Meets EN61000-4-6 Level 2: 0.15~80MHz, 3V				Perf. Criteria A	
Magnetic Field Immunity	Meets EN61000-4-8 Level 2: 50 or 60Hz, 3A/m (rms)				Perf. Criteria A	
Application Note Link	<a href="#">EC3SAWH Series App Notes</a>					
Packaging Information Link	<a href="#">Packaging Information</a>					

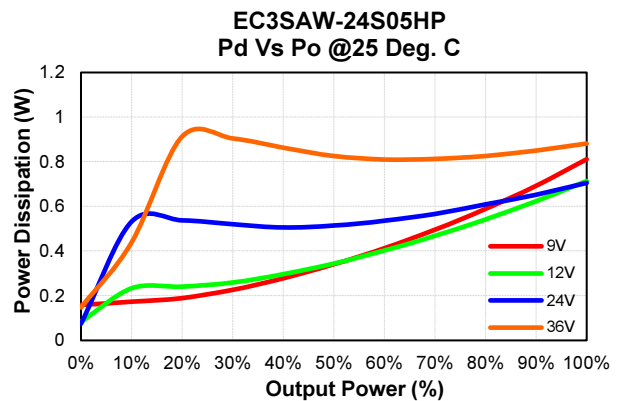
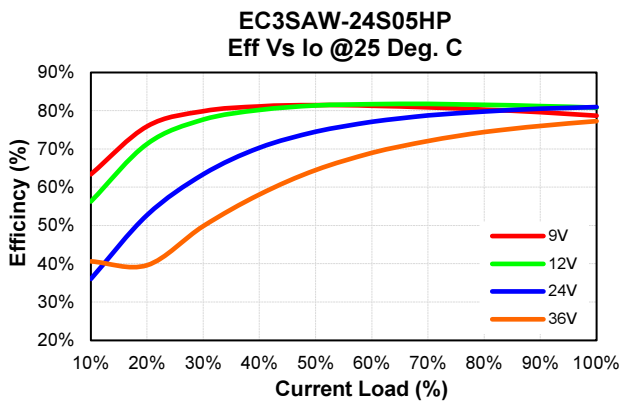
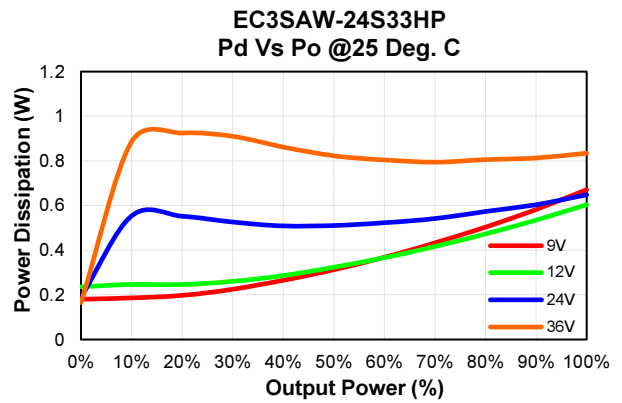
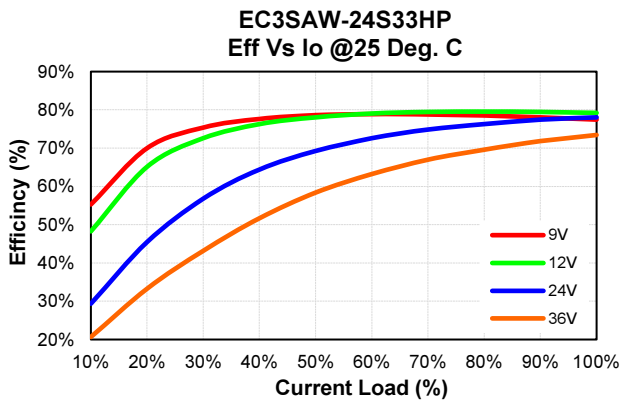


## CHARACTERISTIC CURVE

### Power Derating Curve



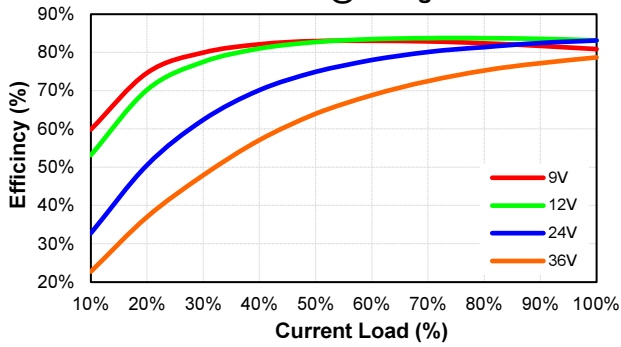
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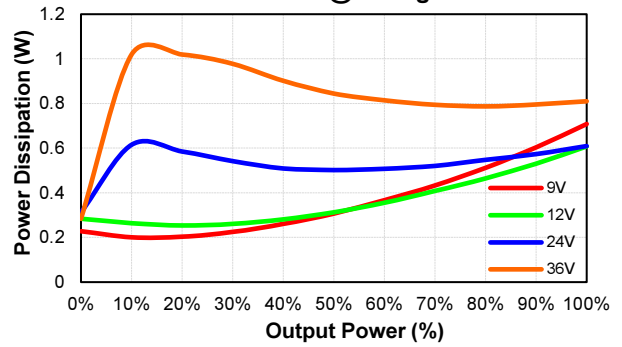


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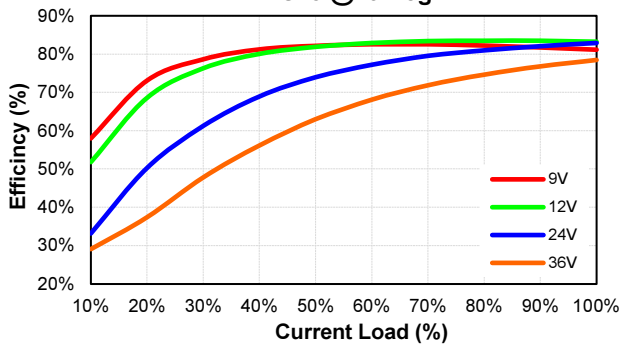
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Eff Vs Io @25 Deg. C



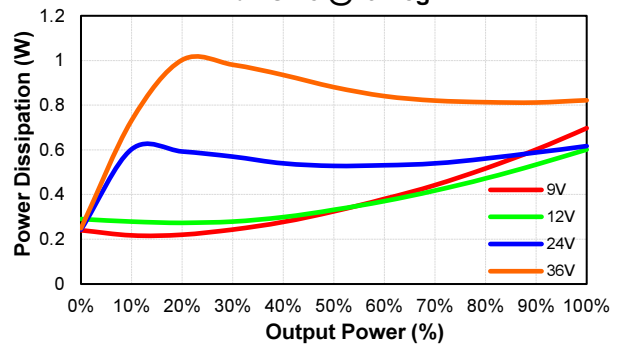
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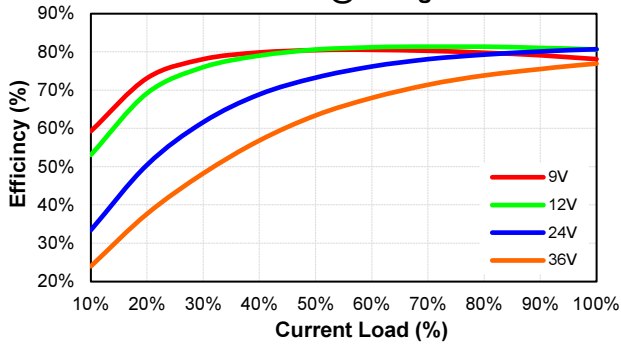
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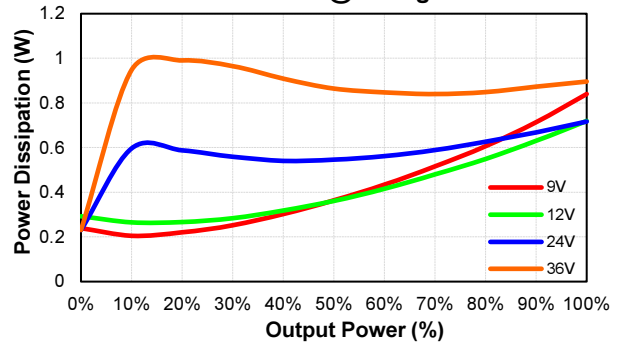
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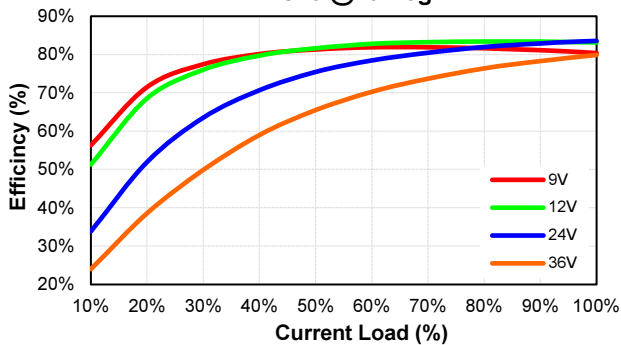
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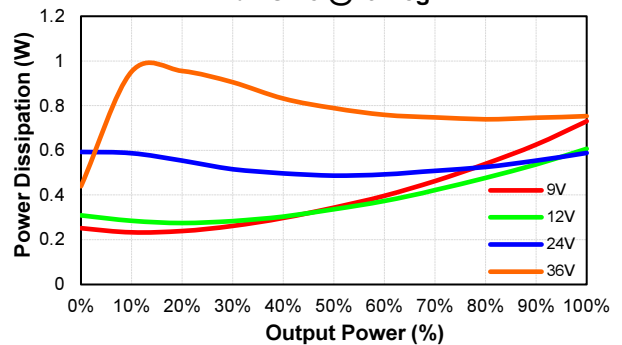
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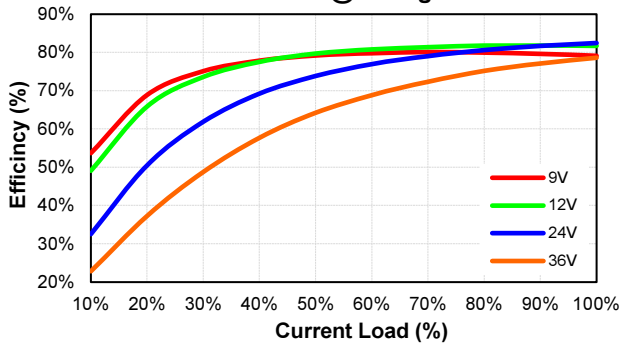
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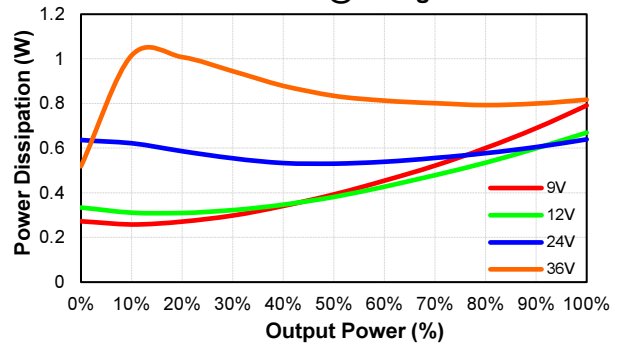


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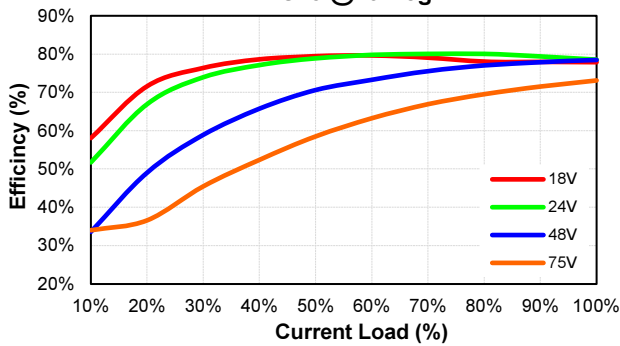
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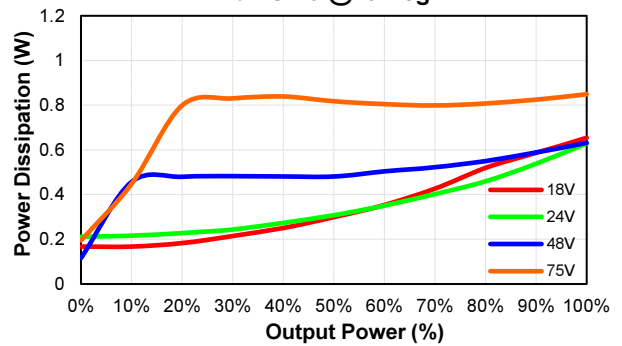
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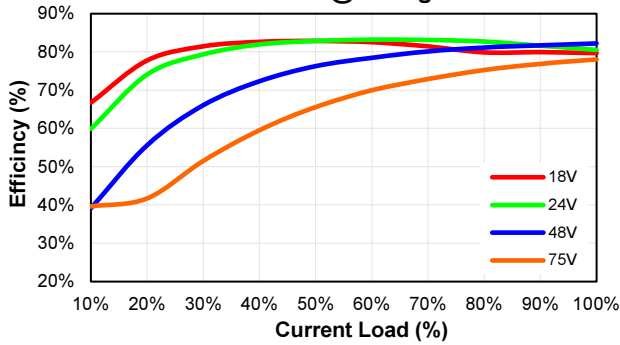
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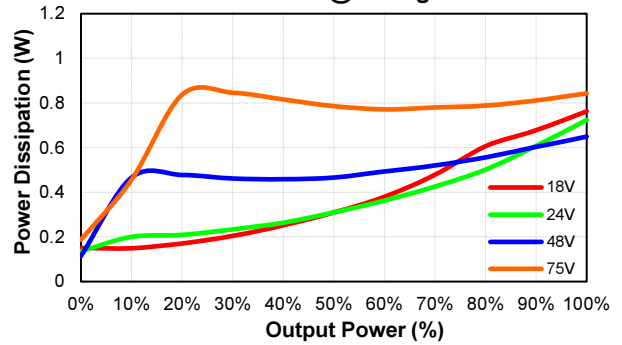
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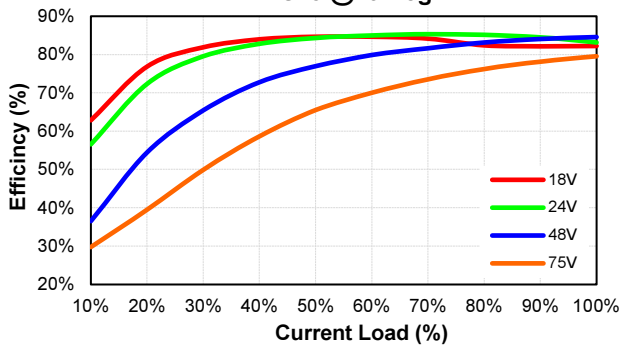
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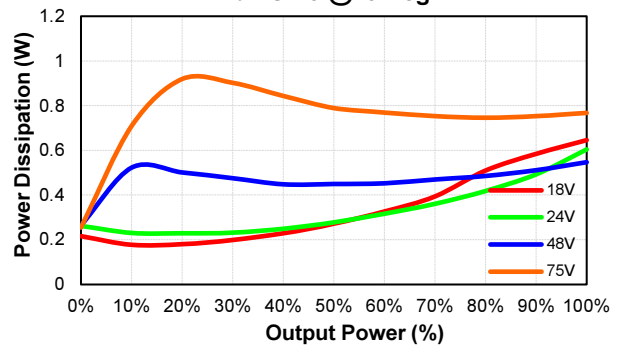
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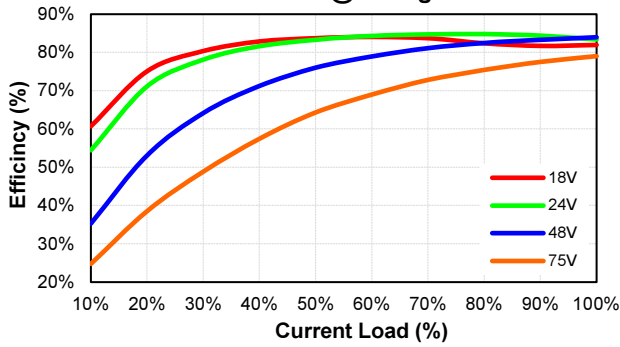
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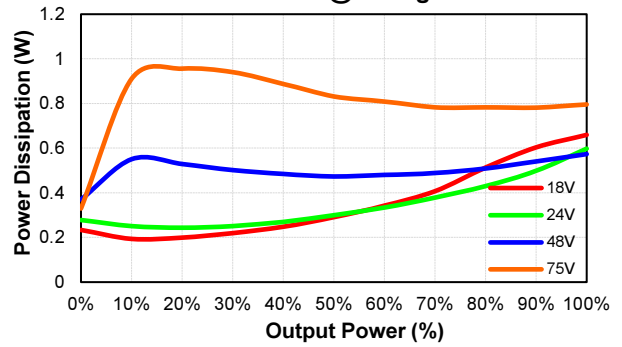


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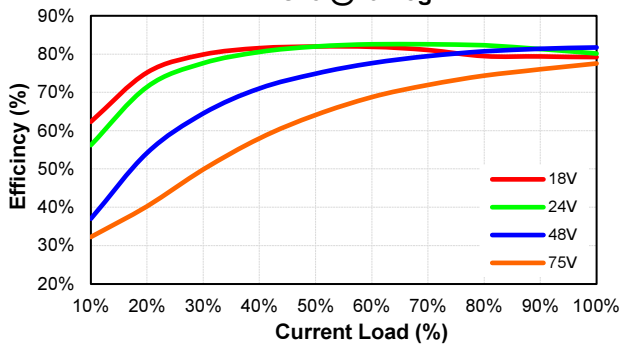
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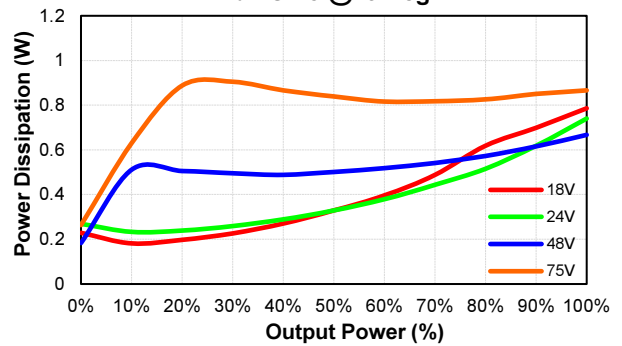
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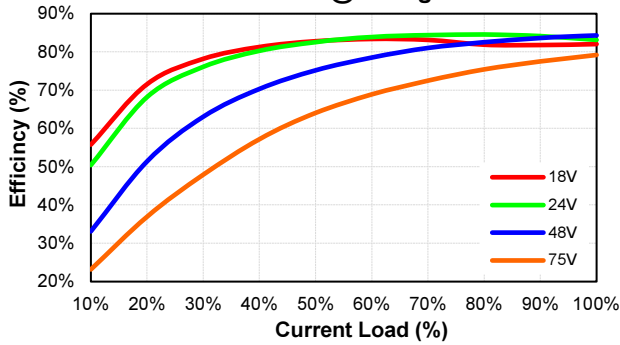
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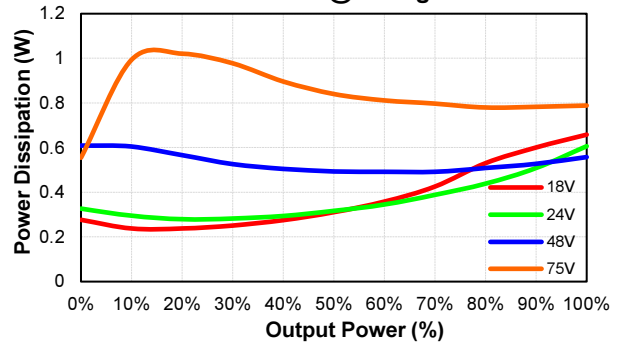
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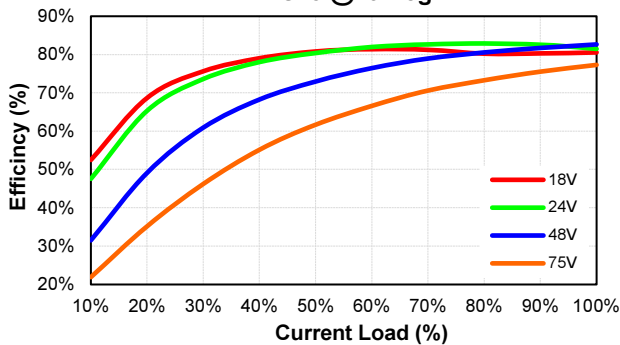
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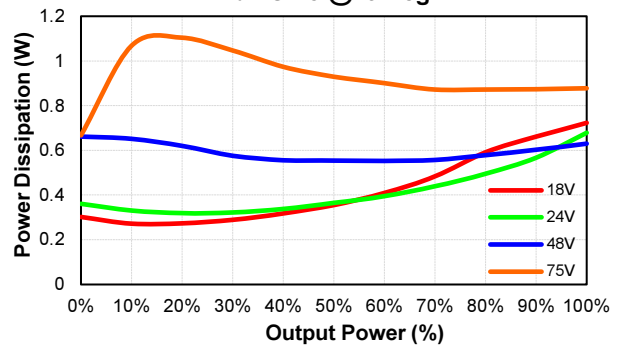
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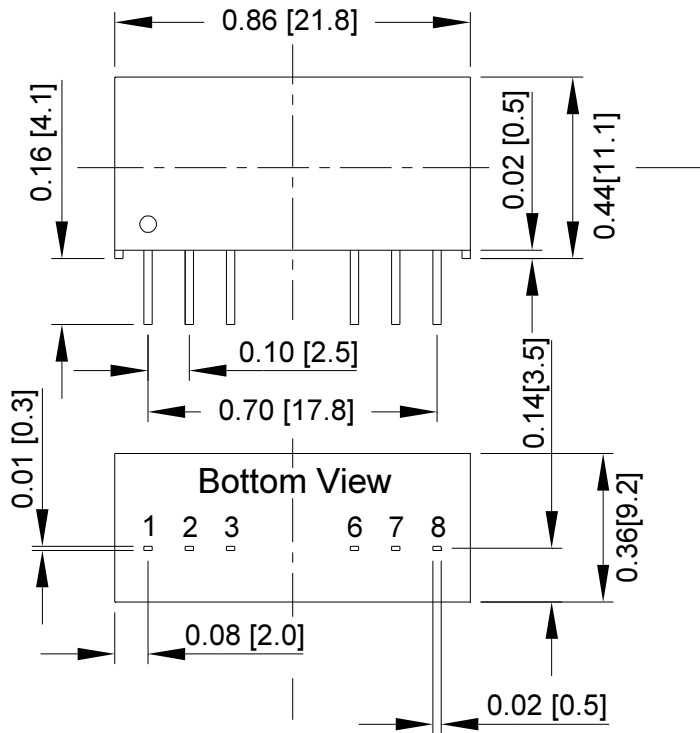
**EC3SAW-48D15HP**  
Pd Vs Po @25 Deg. C





# EC3SAWH Series

## MECHANICAL SPECIFICATION



PIN CONNECTION		
Pin	Single	Dual
1	-V Input	-V Input
2	+V Input	+V Input
3	On/Off	On/Off
6	+V Output	+V Output
7	-V Output	Common
8	NC	-V Output

All Dimensions In Inches(mm)

Tolerances : Inches millimeters

X.XX±0.02 X.X±0.5  
Pin ±0.002 ±0.05