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

CE

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

TECHNICAL SPECIFICATIONS

(All specifications are typical at nominal input, full load at 25℃ unless otherwise noted.)

ABSOLUTE MAXIMUM RATINGS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Input Voltage	Continuous	24Vin 48Vin	-0.3 -0.3		36 74	V_{dc}
Input Surge Voltage	100ms max.	24Vin 48Vin			50 100	V_{dc}
Operating Ambient Temperature	With de-rating, above 68℃ With de-rating, above 71℃	24S(D)05HP Others	-40		85	℃
Maximum Case Temperature	At the center part of case plate	All			100	℃
Storage Temperature		All	-55		125	℃

INPUT CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Operating Input Voltage		24Vin 48Vin	9 18	24 48	36 74	V_{dc}
Under Voltage Protection						
Turn-On Voltage Threshold		24Vin 48Vin			7.5 15.5	V_{dc}
Turn-Off Voltage Threshold		24Vin 48Vin	6 12			V_{dc}
Maximum Input Current	V_{in}=9V, Full load. V_{in}=18V, Full load	24Vin 48Vin		427 213		mA
No-Load Input Current	V_{in}=24, 48V, Io=0A	See Model Number Table				mA
Input Filter	Capacitive	All				
Inrush Current (I^2t)	As per ETS300 132-2.	All			0.01	A^2s
Input Reflected Ripple Current	Vin=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_{in}=24, 48V, Full load, Tc=25℃	All	-1.5		+1.5	%
Output Voltage Balance	V_{in}=24, 48V, Full load, Tc=25℃	Dual	-1.0		+1.0	%
Output Voltage Regulation						
Load Regulation	Full load to 10% load	Single Dual			±0.5 ±1.0	%
Line Regulation	V_{in}=High line to low line, full load	All			±0.5	%
Cross Regulation	Asymmetrical load 25%/100%	Dual			±5	%
Temperature Coefficient	Tc=-40℃ to 85℃	All			±0.03	%/℃
Output Voltage Ripple and Noise (5Hz to 20MHz bandwidth)						
Peak-to-Peak	Full load, Tc=25°C, With 0.1uF MLCC across output and Y-cap 470pF	All			50	mV
Output Current Range	V_{in}= 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

EFFICIENCY

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
100% Load	Vin=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% Vout 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	$V_{on/off}$ to 10%V_{o_set}, Remote on	All		1	2	ms
Turn-On Delay Time, From Input	V_{in_min} to 10%V_{o_set}, Power up	All		1	2	ms
Output Voltage Rise Time	10%V_{o_set} to 90%V_{o_set}	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_{dc}
Isolation Resistance	Input to output	All	1000			MΩ
Isolation Capacitance	Input to output	All		45		pF

FEATURE CHARACTERISTICS

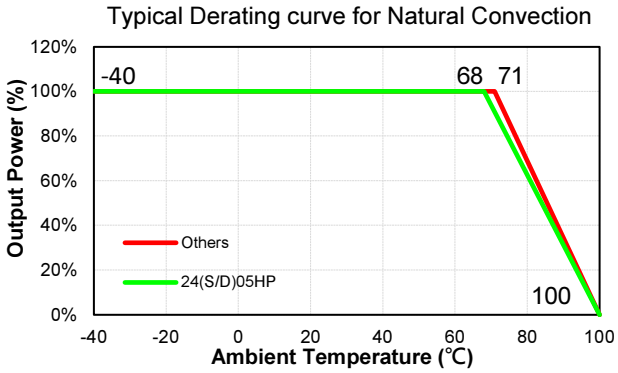
PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Switching Frequency	Pulse frequency modulation (PFM)	All	100			KHz
On/Off Control, Positive Remote On/Off logic, Refer to –Vin pin						
Logic Low (Module Off)	$V_{on/off}$ at $I_{on/off}$=1.0mA	All	0		1.2	V
Logic High (Module On)	Pin open=On, high impedance	All				
Off Converter Input Current	Shutdown input idle current	All			1	mA

GENERAL SPECIFICATIONS

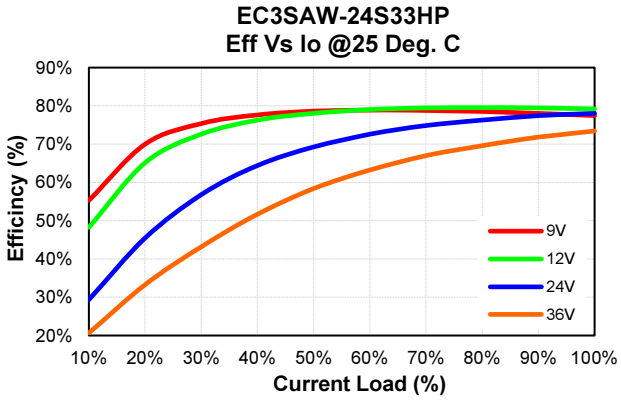
PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
MTBF	I_o=100% of I_{o_max}; MIL-HDBK - 217F_Notice 1, GB, 25℃	Single Dual		2.8 2.1		M hours
Weight		All		4.8		grams
Case Material	Non-Conductive Black Plastic, UL 94V-0					
Potting Material	UL 94V-0					
Pin Material	Base: Copper Plating: Matte 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	EC3SAWH Series App Notes					
Packaging Information Link	Packaging Information					

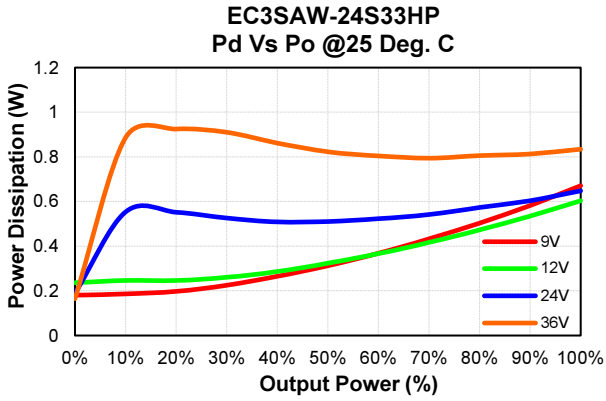
CHARACTERISTIC CURVE

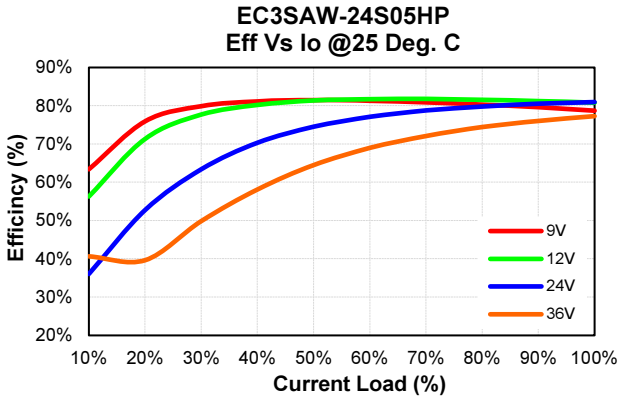
Power Derating Curve

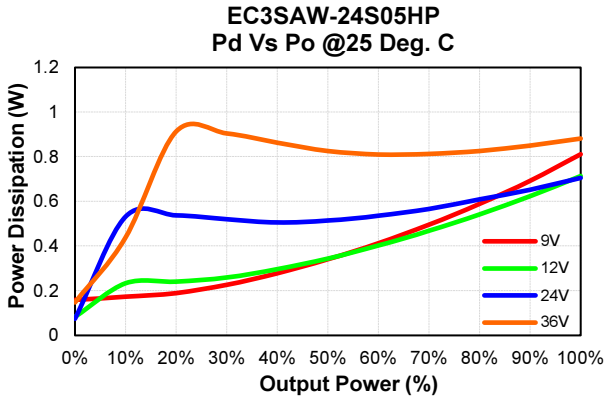


Performance Data

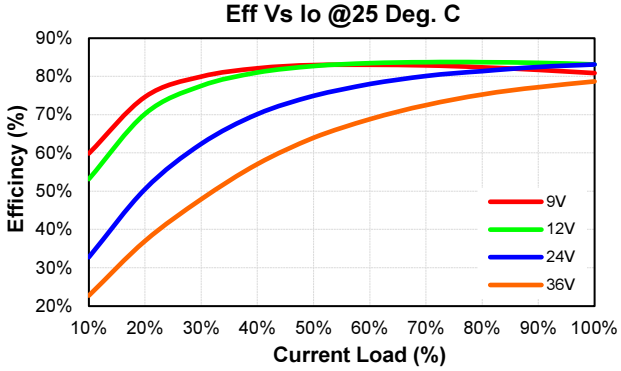




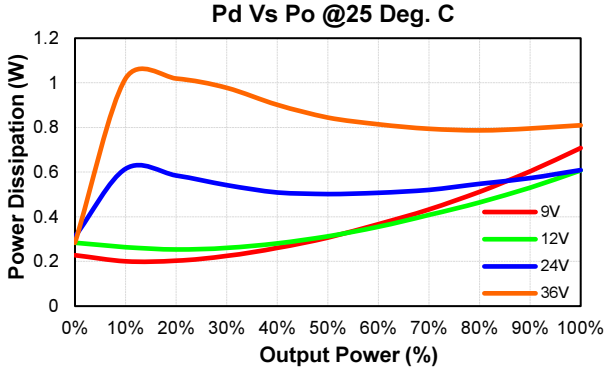




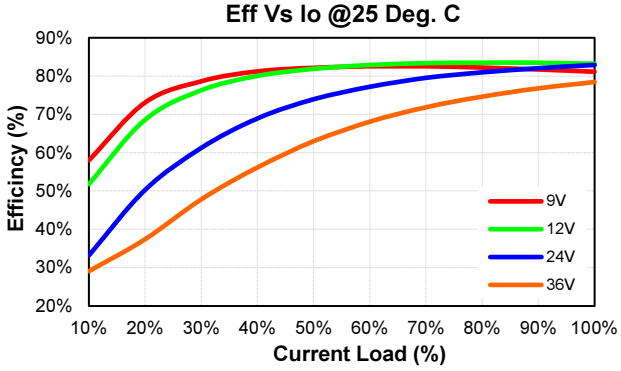
EC3SAW-24S12HP
Eff Vs Io @25 Deg. C



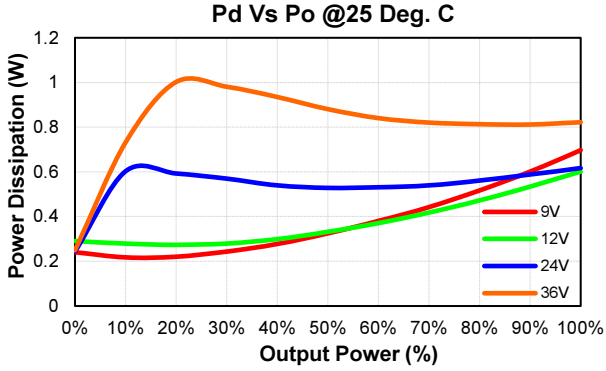
EC3SAW-24S12HP
Pd Vs Po @25 Deg. C



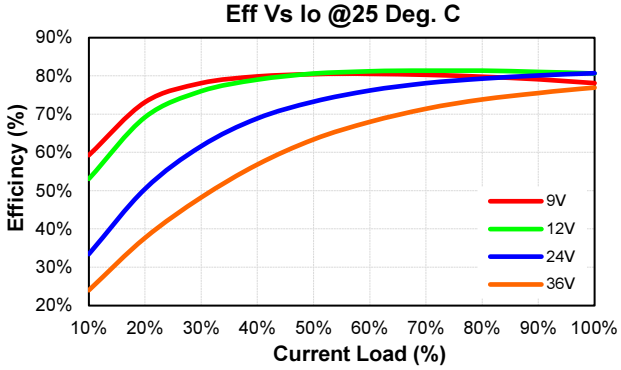
EC3SAW-24S15HP
Eff Vs Io @25 Deg. C



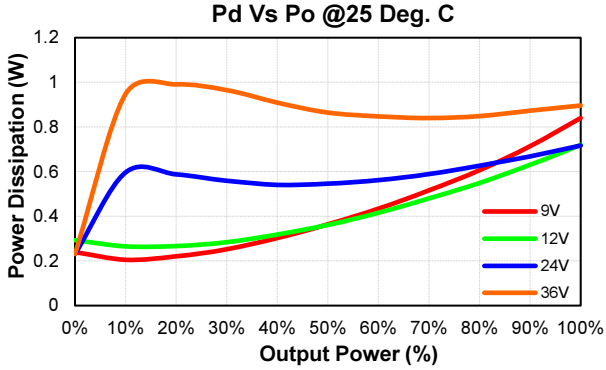
EC3SAW-24S15HP
Pd Vs Po @25 Deg. C



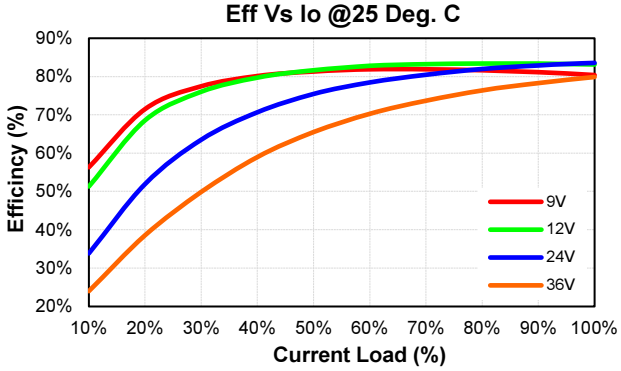
EC3SAW-24D05HP
Eff Vs Io @25 Deg. C



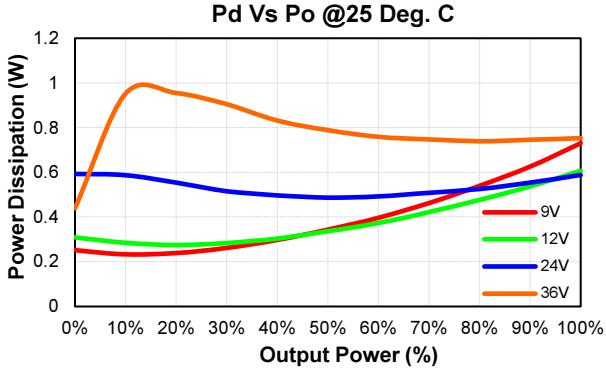
EC3SAW-24D05HP
Pd Vs Po @25 Deg. C



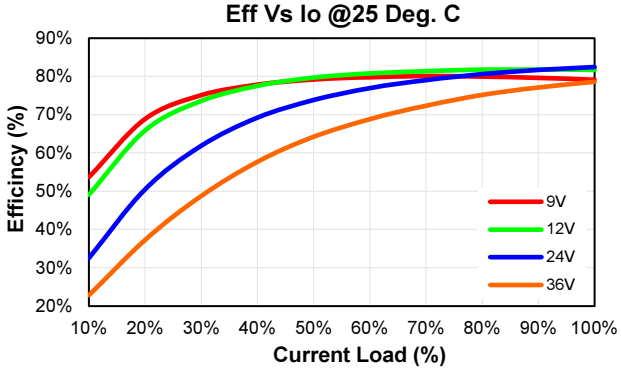
EC3SAW-24D12HP
Eff Vs Io @25 Deg. C



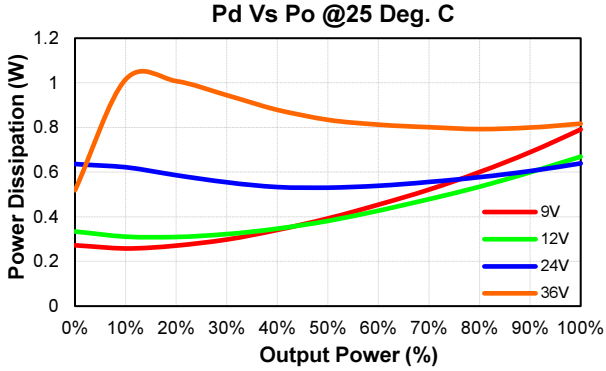
EC3SAW-24D12HP
Pd Vs Po @25 Deg. C



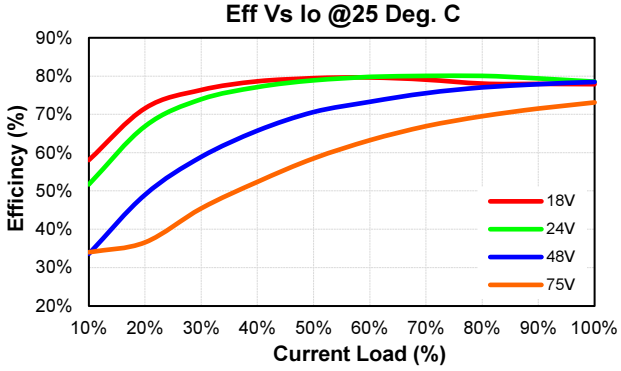
EC3SAW-24D15HP
Eff Vs Io @25 Deg. C



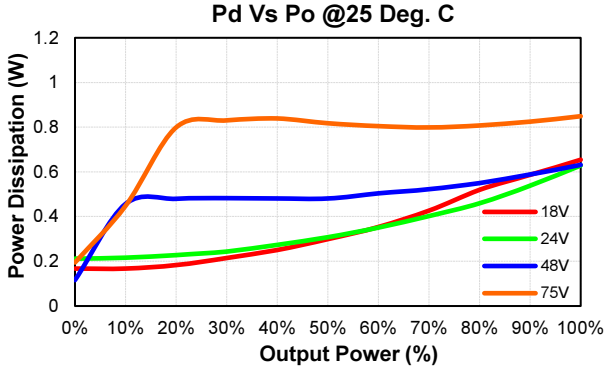
EC3SAW-24D15HP
Pd Vs Po @25 Deg. C



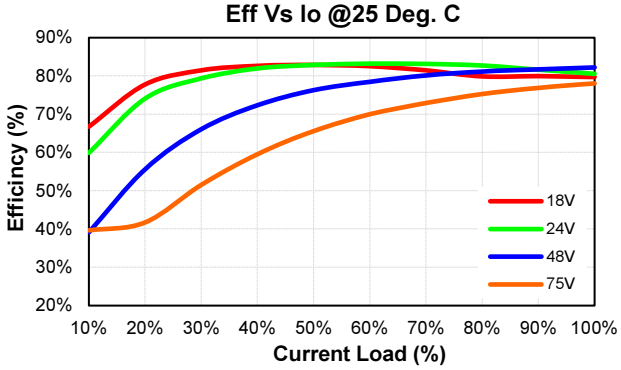
EC3SAW-48S33HP
Eff Vs Io @25 Deg. C



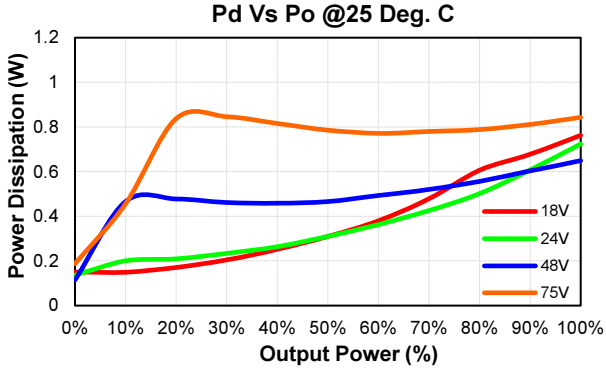
EC3SAW-48S33HP
Pd Vs Po @25 Deg. C



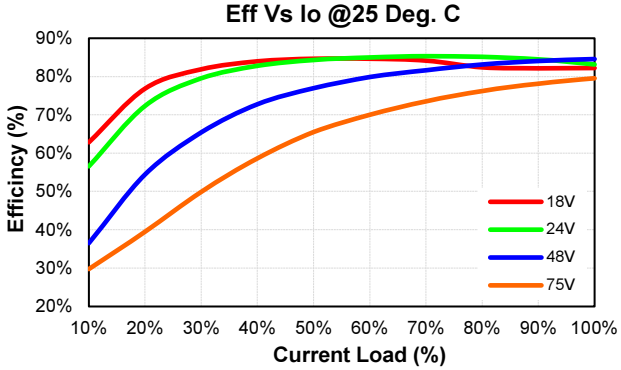
EC3SAW-48S05HP
Eff Vs Io @25 Deg. C



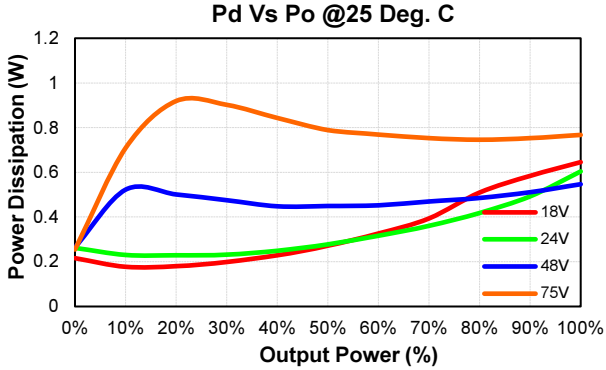
EC3SAW-48S05HP
Pd Vs Po @25 Deg. C



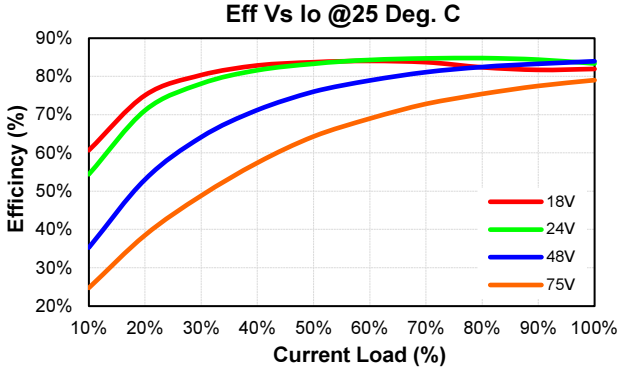
EC3SAW-48S12HP
Eff Vs Io @25 Deg. C



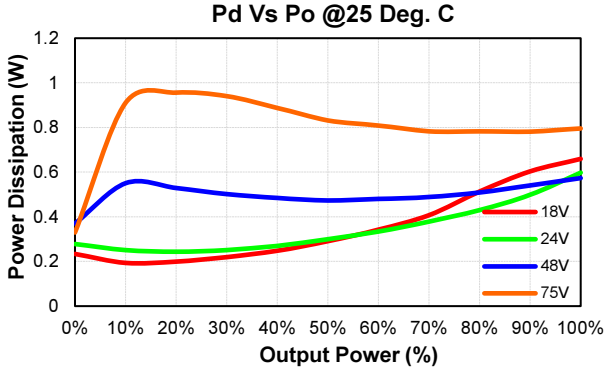
EC3SAW-48S12HP
Pd Vs Po @25 Deg. C



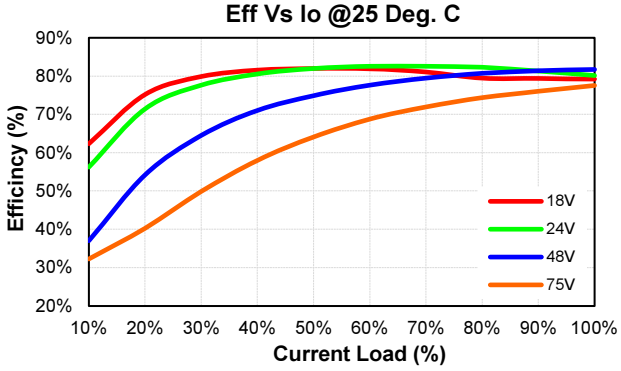
EC3SAW-48S15HP
Eff Vs Io @25 Deg. C



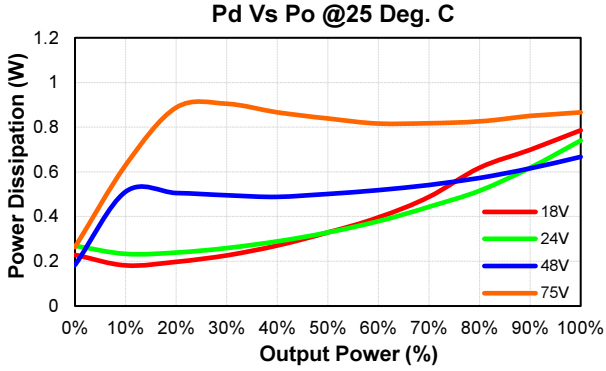
EC3SAW-48S15HP
Pd Vs Po @25 Deg. C



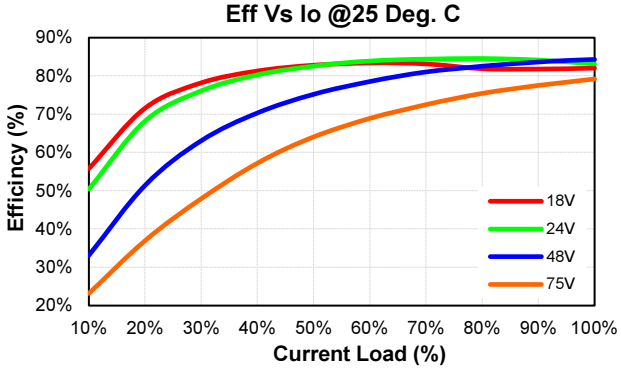
EC3SAW-48D05HP
Eff Vs Io @25 Deg. C



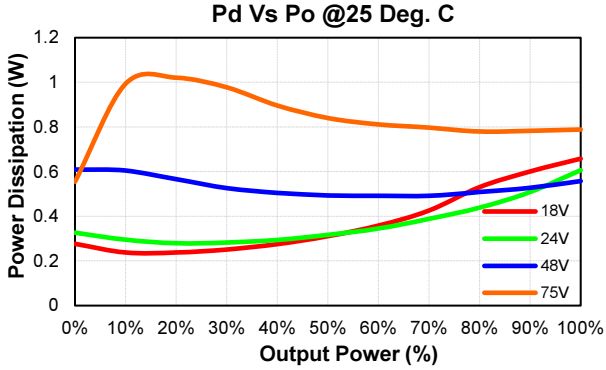
EC3SAW-48D05HP
Pd Vs Po @25 Deg. C



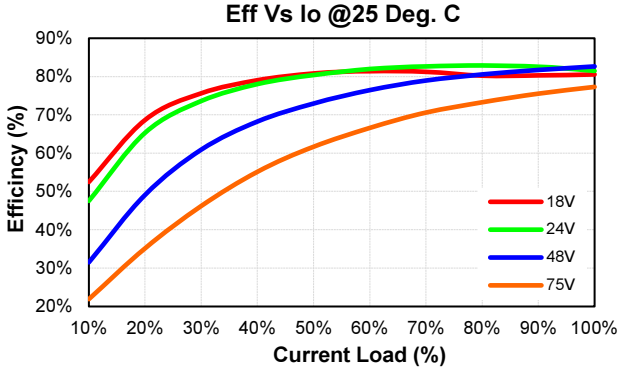
EC3SAW-48D12HP
Eff Vs Io @25 Deg. C



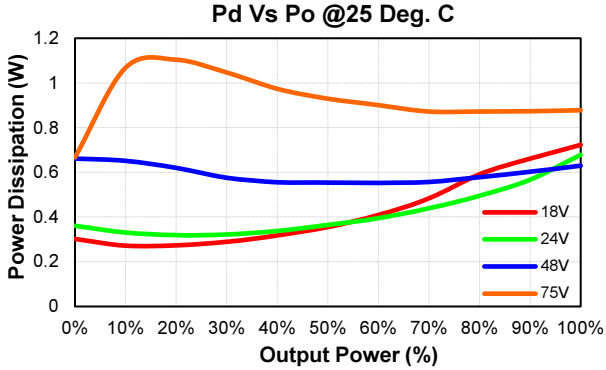
EC3SAW-48D12HP
Pd Vs Po @25 Deg. C



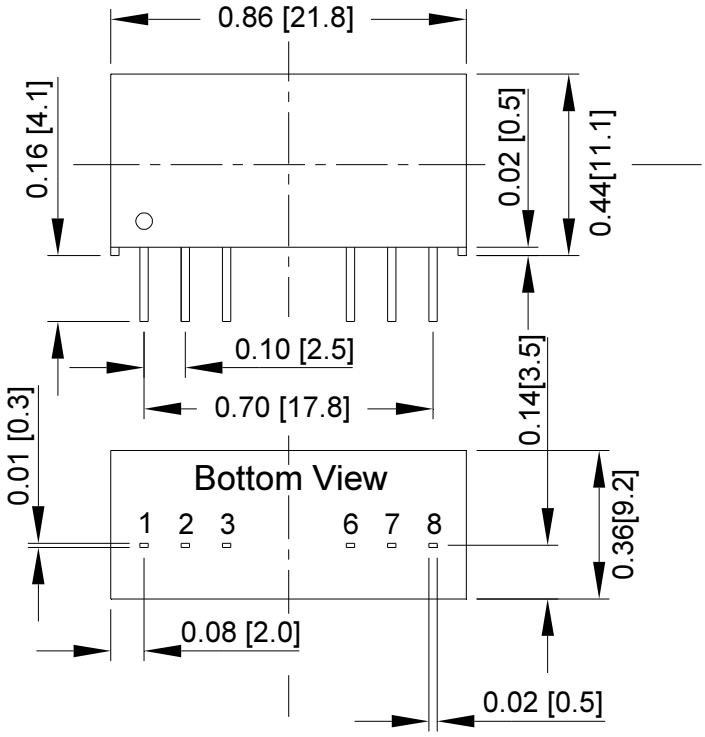
EC3SAW-48D15HP
Eff Vs Io @25 Deg. C



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



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

CINCON Electronics Co. Ltd.
Add: 14F, No. 306, Sec.4, Hsin Yi Rd., Taipei, Taiwan
Tel: 886-2-27086210
Fax: 886-2-27029852
E-mail: sales@cincon.com.tw
Web: www.cincon.com