



# EC2SAW8 SERIES 2 WATT 8:1 INPUT ISOLATED DC-DC CONVERTER

## Features

- Efficiency up to 86%
- Fixed Switching Frequency
- Negative Remote On/Off
- Low No Load Power Consumption
- Fully Protected (OCP/UVLO)
- 3000Vdc I/O Isolation
- Safety Meets IEC/EN/UL 62368-1
- 5000m Operating Altitude



MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT		INPUT CURRENT 48V <sub>in</sub> (TYP.)		% EFF (TYP.)			CAPACITOR LOAD MAX.
			MIN.	MAX.	NO LOAD	FULL LOAD	12V <sub>in</sub>	24V <sub>in</sub>	48V <sub>in</sub>	
EC2SAW8-48S33N	9-75 VDC	3.3 VDC	0 mA	500 mA	5 mA	45 mA	79	79	77	500uF
EC2SAW8-48S05N	9-75 VDC	5 VDC	0 mA	400 mA	5 mA	52 mA	82	82	80	400uF
EC2SAW8-48S12N	9-75 VDC	12 VDC	0 mA	167 mA	8 mA	51 mA	85	85	82	167uF
EC2SAW8-48S15N	9-75 VDC	15 VDC	0 mA	134 mA	8 mA	50 mA	85	86	83	134uF
EC2SAW8-48D05N	9-75 VDC	±5 VDC	0 mA	±200 mA	8 mA	52 mA	82	82	80	200uF
EC2SAW8-48D12N	9-75 VDC	±12 VDC	0 mA	±83 mA	8 mA	51 mA	84	84	82	83uF
EC2SAW8-48D15N	9-75 VDC	±15 VDC	0 mA	±67 mA	8 mA	51 mA	84	84	82	67uF

NOTE:

1. Nominal input voltage 12V<sub>dc</sub>, 24V<sub>dc</sub> or 48V<sub>dc</sub>.

## PART NUMBER

Series	Nominal Input Voltage	Number of Outputs	Nominal Output Voltage	Remote On/Off Logic
EC2SAW8-	II	O	XX	L
EC2SAW8	48 : 48 VDC	S : Single D : Dual	33 : 3.3VDC 05 : 5.0VDC 12 : 12VDC 15 : 15VDC 05 : ±5.0 VDC 12 : ±12 VDC 15 : ±15 VDC	N : Negative

Part Number Example:

**EC2SAW8-48S12N**: 2W, 8:1 9-75Vdc Input, Single 12Vdc Output, Negative Logic



# EC2SAW8 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	All	-0.3		75	V <sub>dc</sub>
Input Surge Voltage	100ms max.	All			100	V <sub>dc</sub>
Operating Temperature	With de-rating, above 85°C	All	-40		105	°C
Operating Case Temperature	At the center part of case plate	All	-40		110	°C
Storage Temperature		All	-55		125	°C

### INPUT CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units	
Operating Input Voltage		All	9	48	75	V <sub>dc</sub>	
Input Under Voltage Protection							
Turn-On Voltage Threshold	100% Load	All	7.6	8.1	8.6	V <sub>dc</sub>	
Turn-Off Voltage Threshold	100% Load	All	7.0	7.5	8.0	V <sub>dc</sub>	
Lockout Hysteresis Voltage	100% Load	All		0.6		V <sub>dc</sub>	
Maximum Input Current	V <sub>in</sub> =9V <sub>dc</sub> , Full load	All		320		mA	
No-Load Input Current	V <sub>in</sub> =48V <sub>dc</sub> , 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			0.1	A <sup>2</sup> s	
Input Reflected Ripple Current	V <sub>in</sub> =Nominal, L=12uH, 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> =48V <sub>dc</sub> , Full load, T <sub>c</sub> =25°C	All	-1.5		+1.5	%	
Output Voltage Balance	V <sub>in</sub> =48V <sub>dc</sub> , Full load, T <sub>c</sub> =25°C	±5Vo others	-2.0 -1.0		+2.0 +1.0	%	
Output Voltage Regulation							
Load Regulation	Full load to no load	Single Dual			±0.5 ±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 (20MHz bandwidth)							
Peak-to-Peak	Full load, T <sub>c</sub> =25°C	All			75	mV	
Output Current Range	V <sub>in</sub> = 9 to 75V <sub>dc</sub>	See Model Number Table					A
Over Current Protection	Hiccup mode. Auto recovery	All	110		230	%	
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 <sub>in</sub> =12V <sub>dc</sub> , 24V <sub>dc</sub> , 48V <sub>dc</sub>	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	All			±5	%
Recovery Time	(within 1% V <sub>out</sub> nominal)	All			250	us



# EC2SAW8 Series

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
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		10		ms
Turn-On Delay Time, From Input	$V_{in\_min.}$ to 10% $V_{o\_set}$ , Power up	All		10		ms
Output Voltage Rise Time	10% $V_{o\_set}$ to 90% $V_{o\_set}$	All		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			M $\Omega$
Isolation Capacitance	Input to output	All		1000		pF

## FEATURE CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Switching Frequency	Pulse frequency modulation (PWM), fixed	All		450		KHz
On/Off Control, Negative Remote On/Off Logic, Refer to -Vin Pin						
Logic Low (Module Off)	$V_{on/off}$ at $I_{on/off}$	All	5.5		15	$V_{dc}$
Logic High (Module On)	< 1.2 $V_{dc}$ or open circuit	All	0		1.2	$V_{dc}$
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°C	3.3Vo		3529		K hours
		5Vo		3073		
		12Vo		3563		
		15Vo		3389		
		$\pm 5V_o$		3604		
		$\pm 12V_o$		3326		
		$\pm 15V_o$		3069		
Weight		All		4.8		grams
Case Material	Non-conductive black plastic, UL 94V-0					
Potting Material	UL 94V-0					
Pin Material	Base: Copper Plating: Nickel and Bright 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					

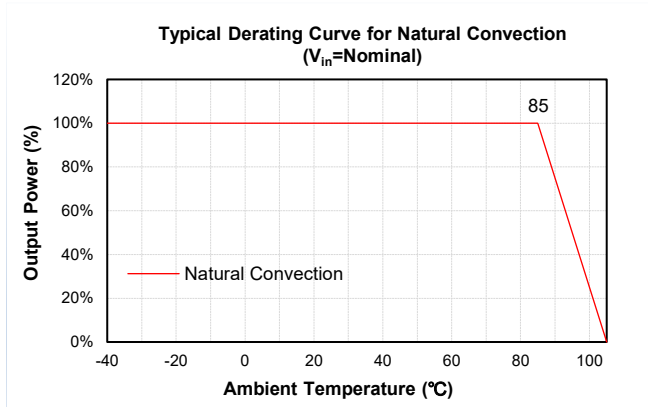
## EMC SPECIFICATIONS (External components required, please refer to application note.)

EMI Conduction	Meets EN 55032 Class A & Class B (with external filter)					
EMI Radiation	Meets EN 55032 Class A (without external filter), Meets EN 55032 Class B (with external filter)					
ESD	Meets EN 61000-4-2	Level 2: Air $\pm 8kV$ , Contact $\pm 4kV$				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, $\pm 0.5kV$ , external input TVS required				Perf. Criteria A
Surge	Meets EN 61000-4-5	Level 2: Line to line, $\pm 0.5kV$ , external input TVS required				Perf. Criteria A
Conducted Immunity	Meets EN 61000-4-6	Level 2: 0.15~80MHz, 3V				Perf. Criteria A
Application Note Link						<a href="#">EC2SAW8 Series App Notes</a>
Packaging Information Link						<a href="#">Packaging Information</a>



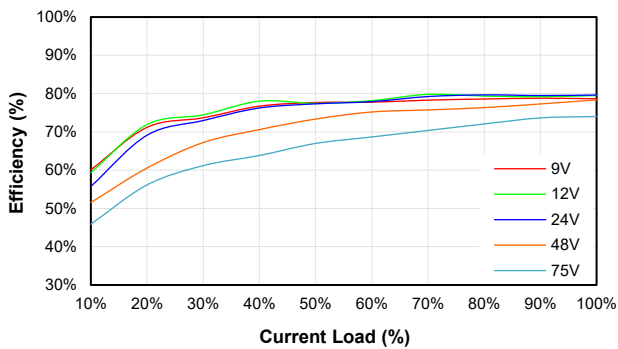
## CHARACTERISTIC CURVE

### Power Derating Curve

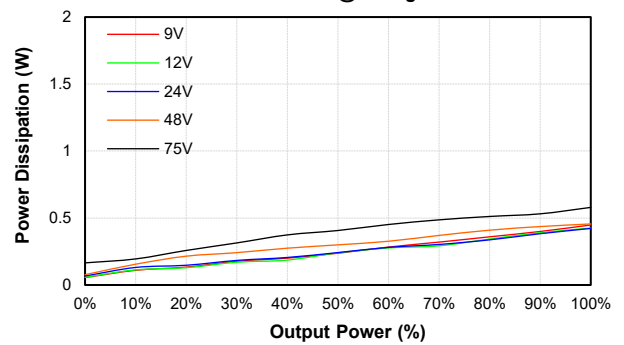


### Performance Data

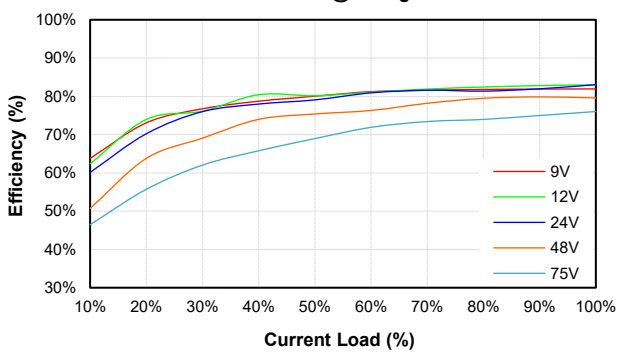
EC2SAW8-48S33N  
Eff Vs Io @25 Deg. C



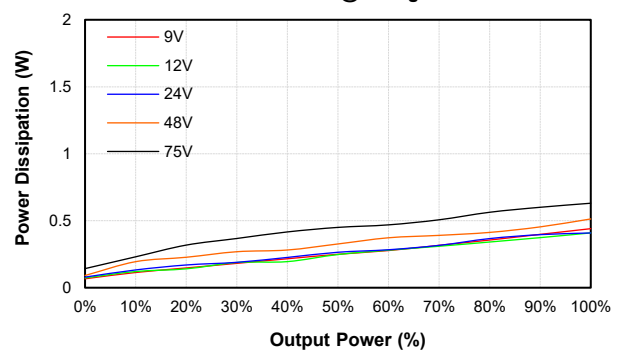
EC2SAW8-48S33N  
Pd Vs Po @25 Deg. C



EC2SAW8-48S05N  
Eff Vs Io @25 Deg. C



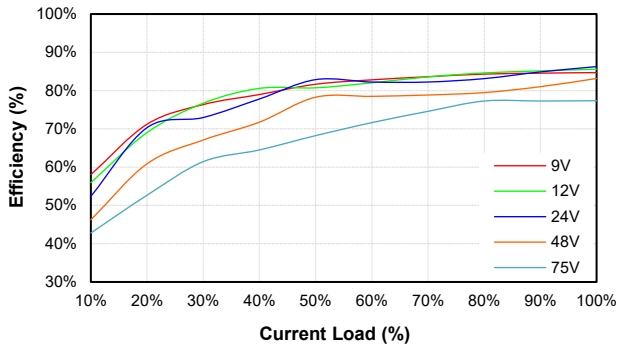
EC2SAW8-48S05N  
Pd Vs Po @25 Deg. C



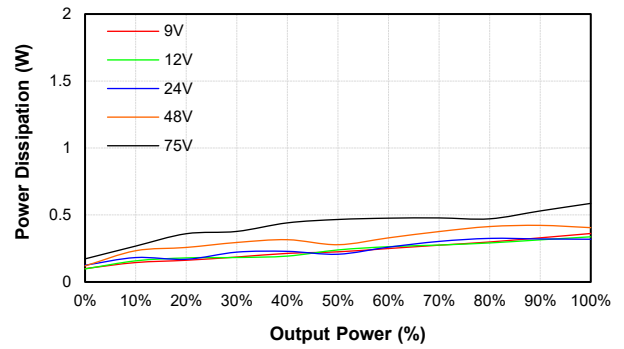


# EC2SAW8 Series

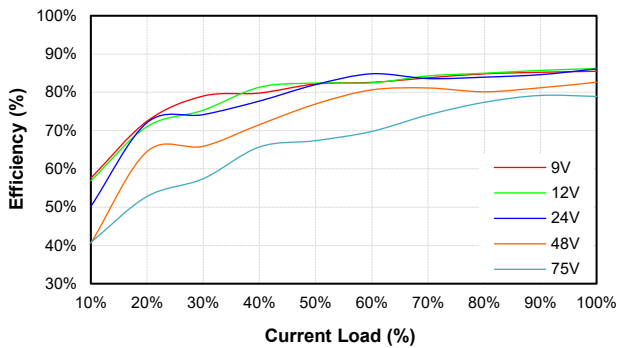
**EC2SAW8-48S12N**  
Eff Vs Io @25 Deg. C



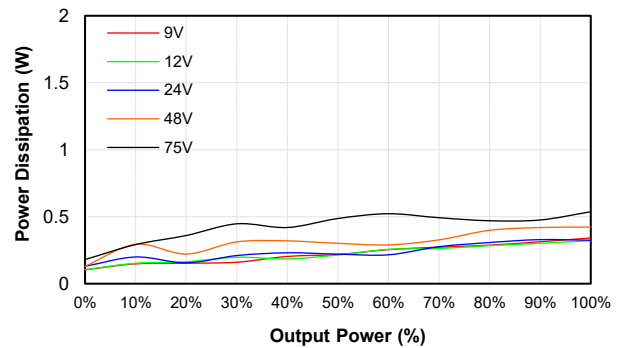
**EC2SAW8-48S12N**  
Pd Vs Po @25 Deg. C



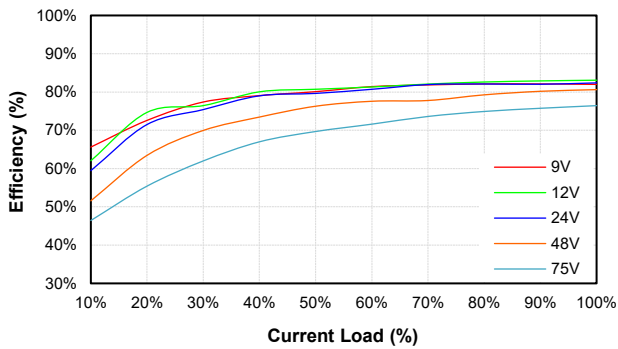
**EC2SAW8-48S15N**  
Eff Vs Io @25 Deg. C



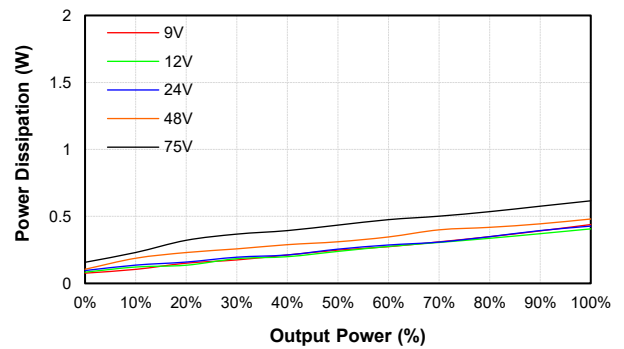
**EC2SAW8-48S15N**  
Pd Vs Po @25 Deg. C



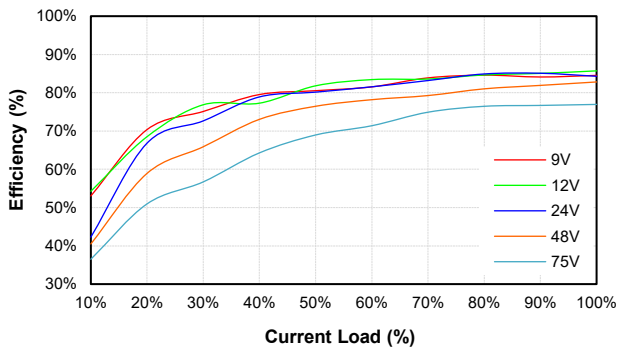
**EC2SAW8-48D05N**  
Eff Vs Io @25 Deg. C



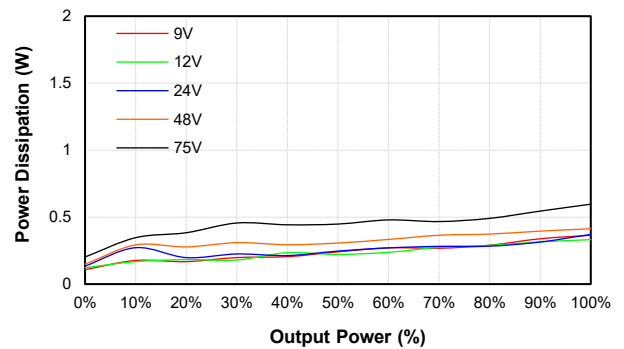
**EC2SAW8-48D05N**  
Pd Vs Po @25 Deg. C



**EC2SAW8-48D12N**  
Eff Vs Io @25 Deg. C



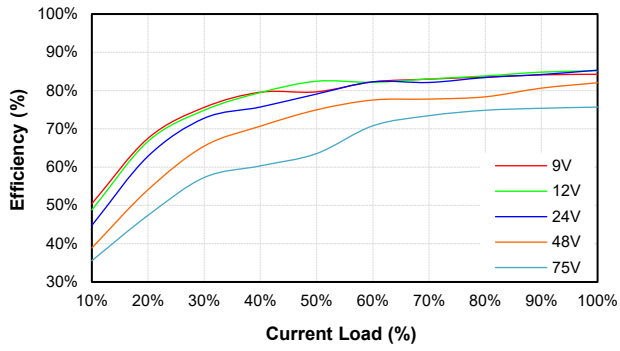
**EC2SAW8-48D12N**  
Pd Vs Po @25 Deg. C



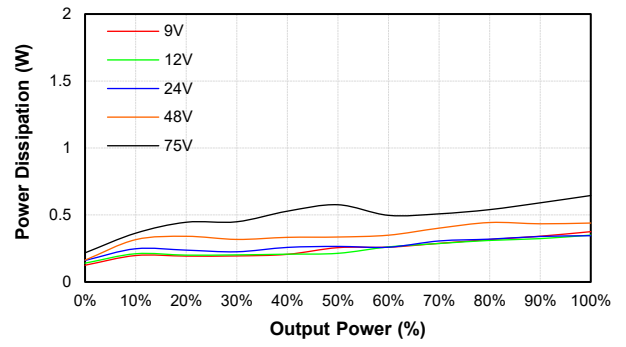


# EC2SAW8 Series

EC2SAW8-48D15N  
Eff Vs Io @25 Deg. C



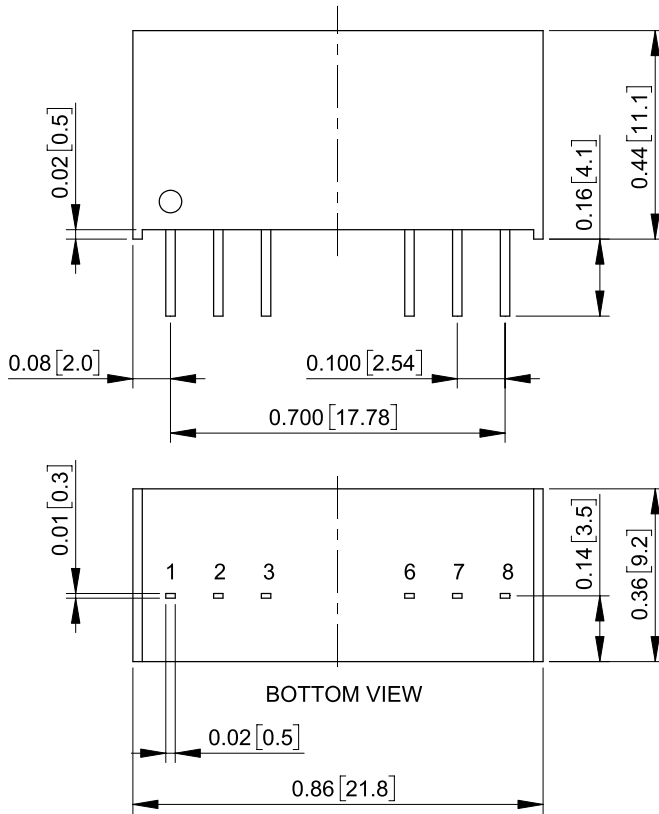
EC2SAW8-48D15N  
Pd Vs Po @25 Deg. C





# EC2SAW8 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	+V Input	+V Input
3	On/Off	On/Off
6	+V Output	+V Output
7	-V Output	Common
8	NC	-V Output

Note: Pin Size is x.xx±0.002 Inch [x.x±0.05 mm]  
 NC-No Connection with Pin