EC5SBW SERIES
30 WATT 4:1 INPUT ISOLATED DC-DC CONVERTER

Features

- Efficiency up to 90%
- Fixed Switching Frequency
- Regulated Outputs
- Remote On/Off
- Low No Load Power Consumption
- Fully Protected (OCP/OVP/UVLO)
- 1500Vdc I/O Isolation
- No Tantalum Capacitor Inside
- Five-Sided Shielded Metal Case
- Meets Industrial Standard 1"x1"x0.4"
- UL62368-1 Approval
- CB Test Certificate IEC62368-1
- 5000m Operating Altitude

MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT		INPUT CURRENT		% EFF.		CAPACITOR LOAD MAX.
			MIN.	MAX.	NO LOAD	FULL LOAD	(2)	(1)	
EC5SBW-24S33	9-36 VDC	3.3 VDC	0 mA	7500 mA	10 mA	1172 mA	88	88	7500uF
EC5SBW-24S05	9-36 VDC	5 VDC	0 mA	6000 mA	10 mA	1389 mA	89	90	6000uF
EC5SBW-24S12	9-36 VDC	12 VDC	0 mA	2500 mA	10 mA	1404 mA	89	89	2500uF
EC5SBW-24S15	9-36 VDC	15 VDC	0 mA	2000 mA	10 mA	1404 mA	89	89	2000μF
EC5SBW-24D12	9-36 VDC	±12 VDC	0 mA	±1250 mA	10 mA	1404 mA	88	88	1250μF
EC5SBW-24D15	9-36 VDC	±15 VDC	0 mA	±1000 mA	10 mA	1404 mA	88	88	1000uF
EC5SBW-48S33	18-75 VDC	3.3 VDC	0 mA	7500 mA	8 mA	586 mA	88	88	7500uF
EC5SBW-48S05	18-75 VDC	5 VDC	0 mA	6000 mA	8 mA	694 mA	90	90	6000uF
EC5SBW-48S12	18-75 VDC	12 VDC	0 mA	2500 mA	8 mA	694 mA	90	89	2500uF
EC5SBW-48S15	18-75 VDC	15 VDC	0 mA	2000 mA	8 mA	702 mA	90	89	2000μF
EC5SBW-48D12	18-75 VDC	±12 VDC	0 mA	±1250 mA	8 mA	710 mA	89	88	1250μF
EC5SBW-48D15	18-75 VDC	±15 VDC	0 mA	±1000 mA	8 mA	702 mA	89	89	1000uF

NOTE:

1. Nominal Input Voltage 24 or 48 VDC
2. Measured at 12VDC for 24Vin, 24VDC for 48Vin

PART NUMBER

Series	Nominal Input Voltage	Number of Outputs	Nominal Output Voltage	Remote On/Off Logic
EC5SBW-	II	O	XX	L
EC5SBW	24: 24VDC 48: 48VDC	S: Single D: Dual	33: 3.3VDC 05: 5.0VDC 12: 12VDC 15: 15VDC	None: Positive N: Negative

Part Number Example:

EC5SBW-24S12N: 1.0"x1.0", 30W, 4:1 9-36Vdc Input, Single 12Vdc Output, Negative 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 75	V_{dc}
Input Surge Voltage	100ms max.	24Vin 48Vin			50 100	V_{dc}
Operating Case Temperature	At the center part of case	All	-40		105	℃
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 75	V_{dc}
Input Under Voltage Lockout						
Turn-On Voltage Threshold	100% Load	24Vin 48Vin	8 16.5	8.5 17	8.8 17.5	V_{dc}
Turn-Off Voltage Threshold	100% Load	24Vin 48Vin	7.7 15.5	8 16	8.3 16.5	V_{dc}
Lockout Hysteresis Voltage	100% Load	24Vin 48Vin		0.5 1		V_{dc}
Maximum Input Current	V_{in}=9V, Full Load V_{in}=18V, Full Load	24Vin 48Vin			3900 1950	mA
No-Load Input Current	V_{in}=Nominal, Io=0A	See Model Number Table				mA
Input Filter	Pi filter	All				
Inrush Current (I^2t)	As per ETS300 132-2	All			0.1	A^2s
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}=Nominal, full load, T_c=25℃	All	-1.5		+1.5	%
Output Voltage Balance	V_{in}=Nominal, full load, T_c=25℃	Dual	-1.5		+1.5	%
Output Voltage Regulation						
Load Regulation	Full load to no load	Single Dual			±0.2 ±1.0	%
Line Regulation	V_{in}=High line to low line, full load	Single Dual			±0.2 ±0.5	%
Cross Regulation	Load cross variation 10%/100%	Dual			±5	%
Temperature Coefficient	T_c=-40℃ to 85℃	All			±0.03	%/℃
Output Voltage Ripple and Noise (5Hz to 20MHz bandwidth)						
Peak-to-Peak	Full load, 1.0uF ceramic capacitors	3.3 & 5Vo Others			75 100	mV
Output Current Range	V_{in}=Nominal,	See Model Number Table				A
Over Current Protection	Hiccup mode. Auto recovery	All	110	140	170	%
Short Circuit Protection		All	Continuous, Auto Recovery			
External Load Capacitance	Full load (resistive)	See Model Number Table				uF

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Over Voltage Protection	Zener clamp	3.3Vo 5Vo 12Vo 15Vo ±12Vo ±15Vo		3.9 6.2 15 18 ±15 ±18		V_{dc}

EFFICIENCY

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
100% Load	V_{in}=Nominal, full load, T_c=25℃	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			±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		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		10		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			900 1500	V_{ac} V_{dc}
Isolation Resistance	Input to output	All	1000			MΩ
Isolation Capacitance	Input to output (10KHz, 0.25V)	All		1500		pF

FEATURE CHARACTERISTICS

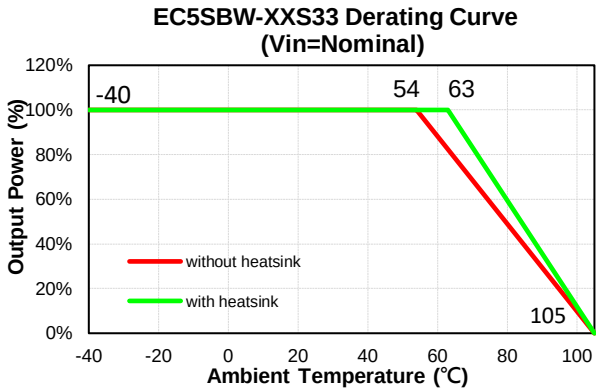
PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Switching Frequency	Output ripple frequency	Vo=3.3&5V Others	240 300	270 330	300 360	KHz
On/Off Control, Positive Remote On/Off logic, Refer to –Vin Pin.						
Logic Low (Module Off)	$V_{on/off}$ at $I_{on/off}$=1.0mA	All	0		1.2	V
Logic High (Module On)	$V_{on/off}$ at $I_{on/off}$=0.0uA, Pin open=On	All	3.5 or Open Circuit		75	V
On/Off Control, Negative Remote On/Off logic, Refer to –Vin Pin						
Logic High (Module Off)	$V_{on/off}$ at $I_{on/off}$=0.0uA, Pin open=Off	All	3.5 or Open Circuit		75	V
Logic Low (Module On)	$V_{on/off}$ at $I_{on/off}$=1.0mA	All	0		1.2	V
On/Off Current (for both remote on/off logic)	$I_{on/off}$ at $V_{on/off}$=0V	All		0.4	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

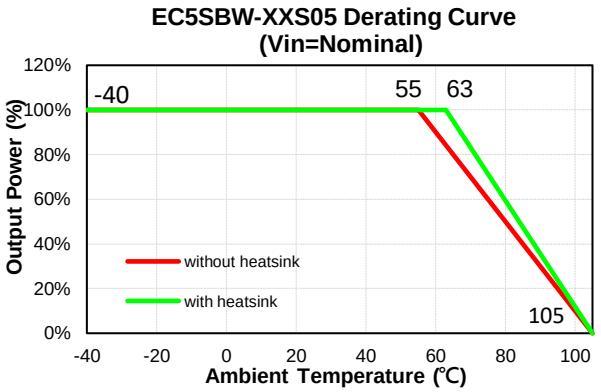
GENERAL SPECIFICATIONS

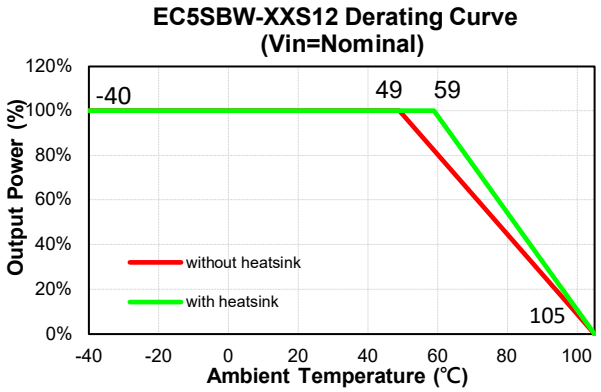
PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
MTBF	I_o=100% of I_{o_max}; MIL-HDBK - 217F_Notice 1, GB, 25℃	24S33		903		K hours
		24S05		799		
		24S12		1090		
		24S15		1125		
		24D12		1149		
		24D15		1221		
		48S33		925		
		48S05		813		
		48S12		1114		
		48S15		1215		
		48D12		1156		
		48D15		1244		
Weight		All		18		grams
Case Material	Black Coated Copper					
Base plate Material	Plastic, DAP					
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					
EMI	Meets EN55022, Conducted with external input filter					Class A
ESD	IEC61000-4-2 Level 3: Air ±8kV, Level 2: Contact ±4kV					Perf. Criteria A
Radiated immunity	EN61000-4-3 Level 2: 80~1000MHz, 3V/m					Perf. Criteria A
Fast Transient	EN61000-4-4 Level 1: On power input port, ±0.5kV, external input TVS required					Perf. Criteria A
Surge	EN61000-4-5 Level 1: Line to line, ±0.5kV					Perf. Criteria A
Conducted immunity	EN61000-4-6 Level 2: 0.15~80MHz, 3V					Perf. Criteria A
Application Note Link	EC5SBW Series App Notes					
Packaging Information Link	Packaging Information					

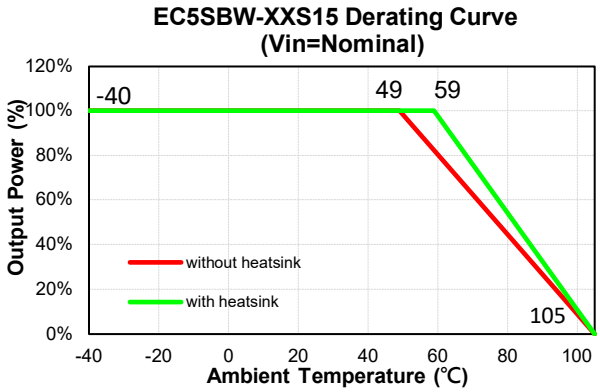
CHARACTERISTIC CURVE

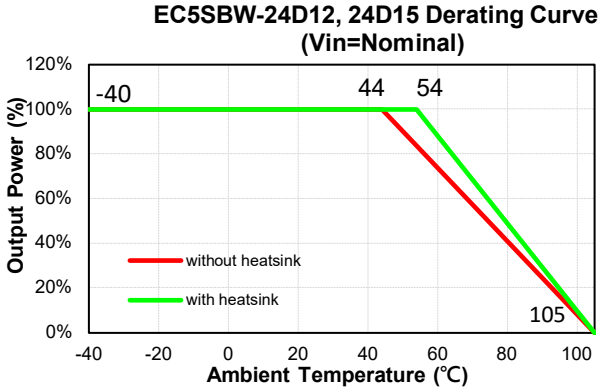
Power Derating Curve

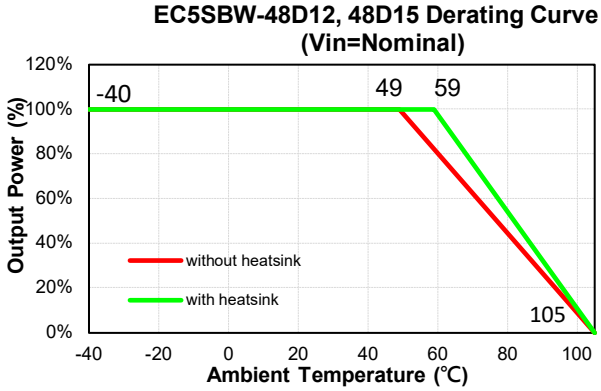




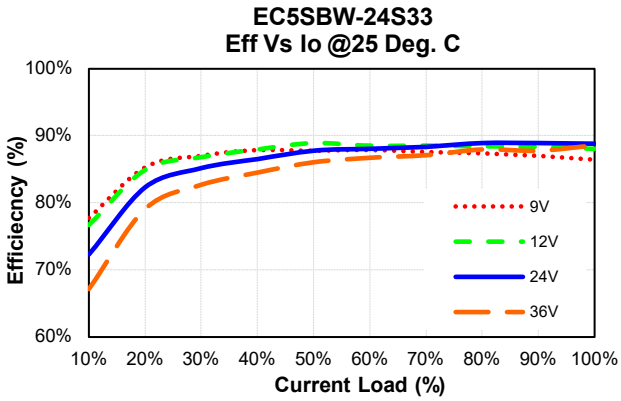


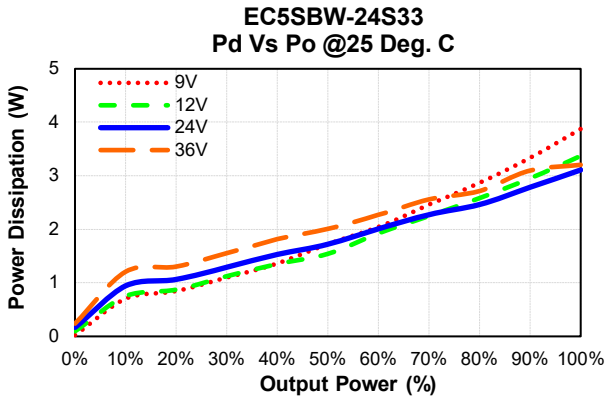




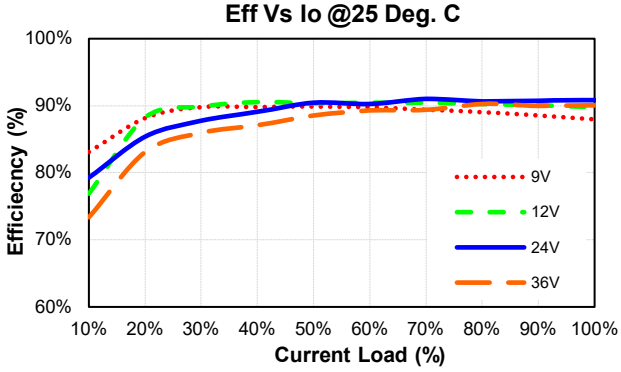


Performance Data

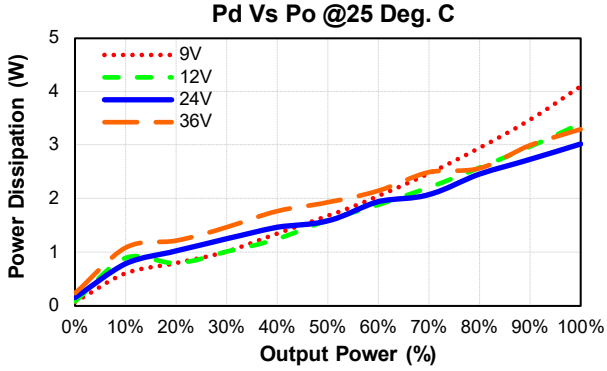




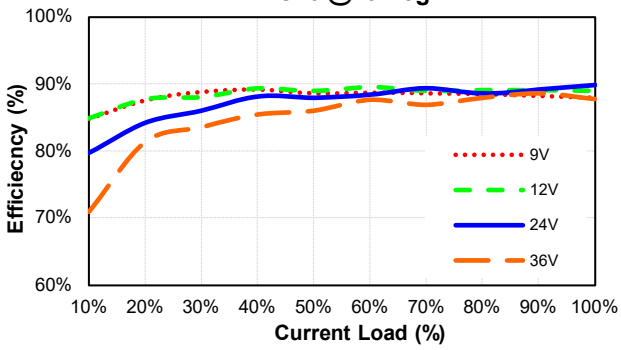
EC5SBW-24S05
Eff Vs Io @25 Deg. C



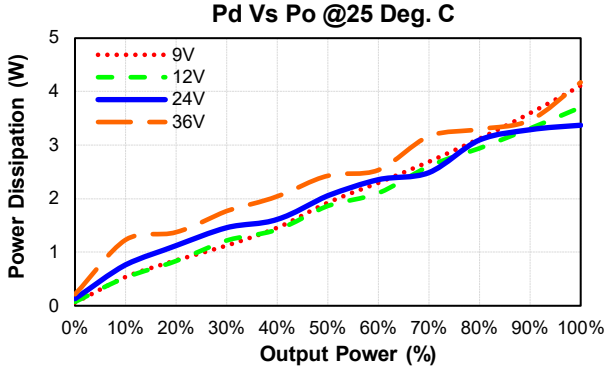
EC5SBW-24S05
Pd Vs Po @25 Deg. C



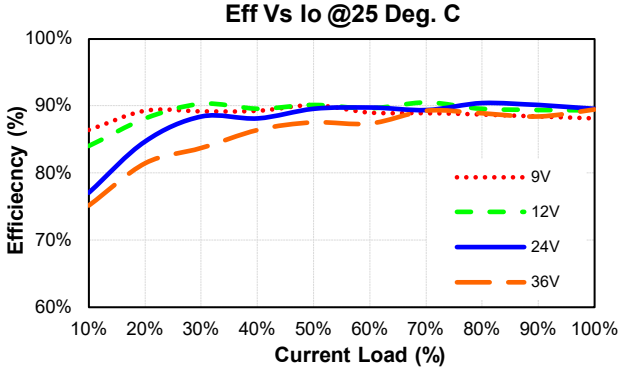
EC5SBW-24S12
Eff Vs Io @25 Deg. C



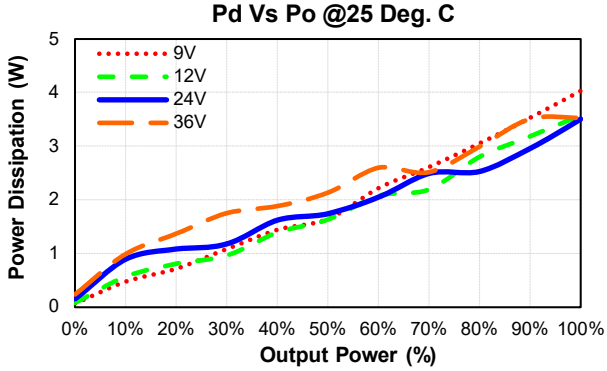
EC5SBW-24S12
Pd Vs Po @25 Deg. C



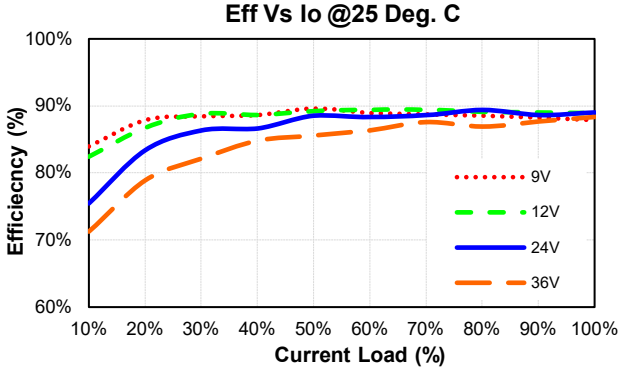
EC5SBW-24S15
Eff Vs Io @25 Deg. C



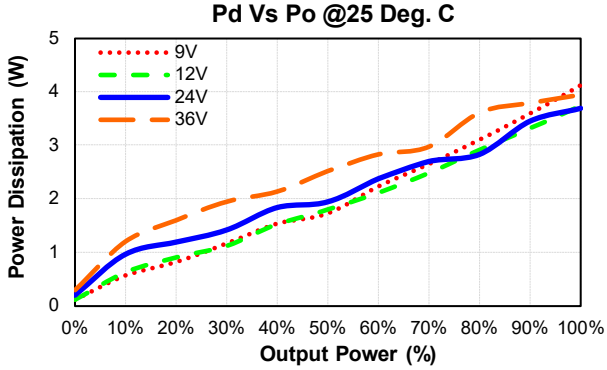
EC5SBW-24S15
Pd Vs Po @25 Deg. C



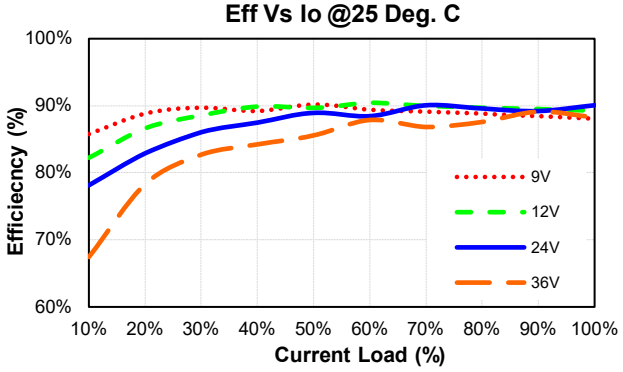
EC5SBW-24D12
Eff Vs Io @25 Deg. C



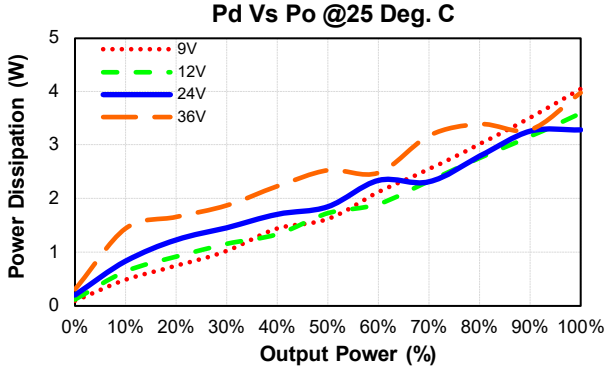
EC5SBW-24D12
Pd Vs Po @25 Deg. C



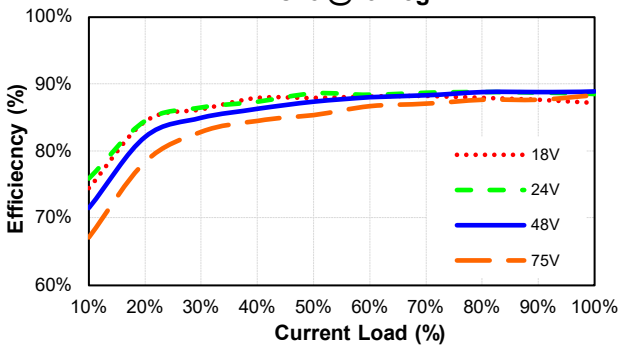
EC5SBW-24D15
Eff Vs Io @25 Deg. C



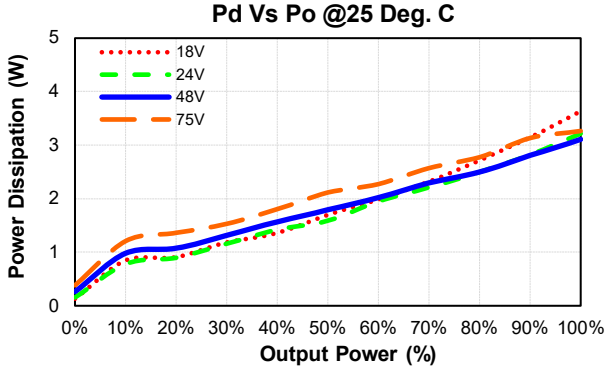
EC5SBW-24D15
Pd Vs Po @25 Deg. C



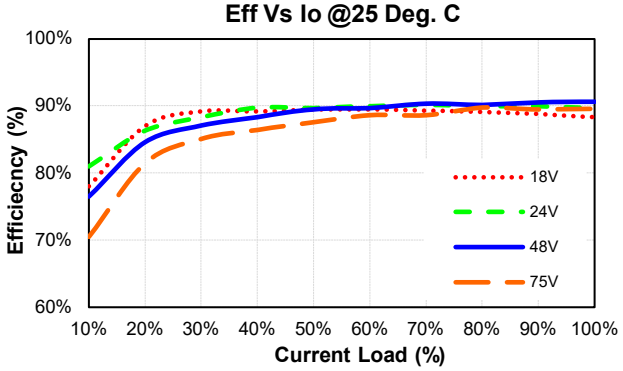
EC5SBW-48S33
Eff Vs Io @25 Deg. C



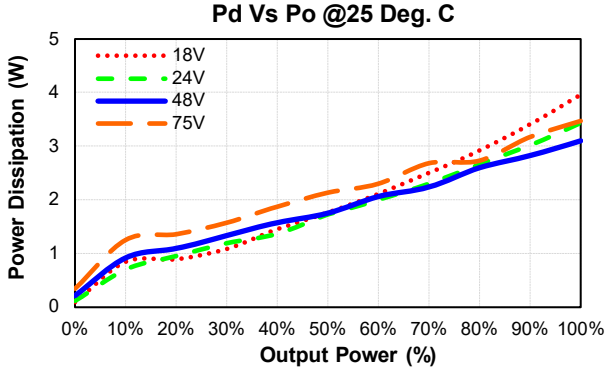
EC5SBW-48S33
Pd Vs Po @25 Deg. C



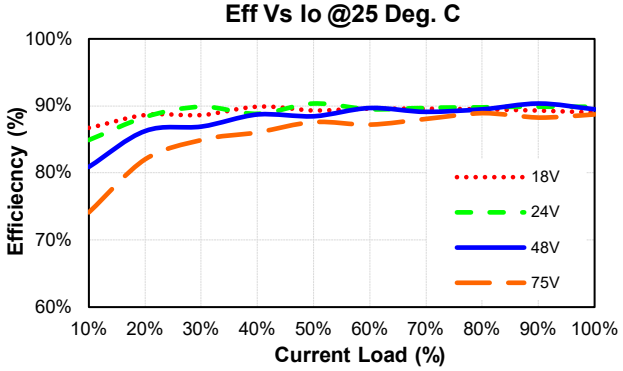
EC5SBW-48S05
Eff Vs Io @25 Deg. C



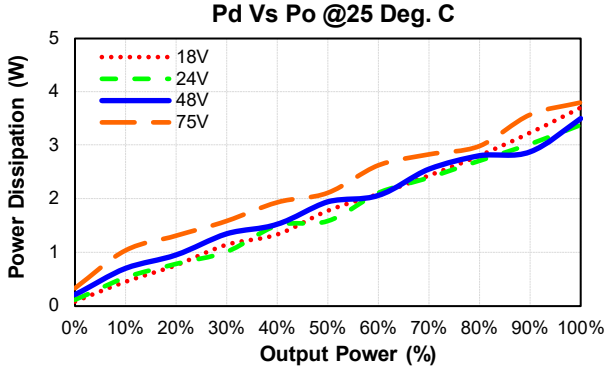
EC5SBW-48S05
Pd Vs Po @25 Deg. C



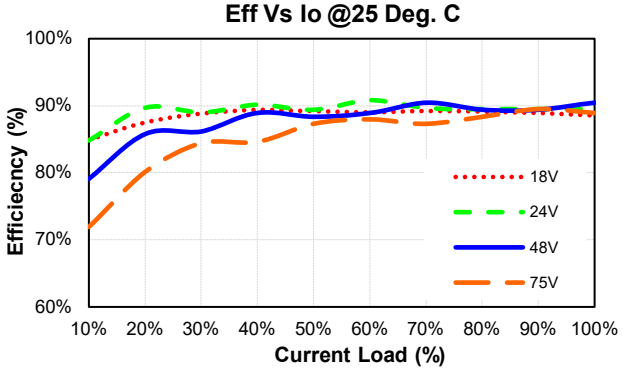
EC5SBW-48S12
Eff Vs Io @25 Deg. C



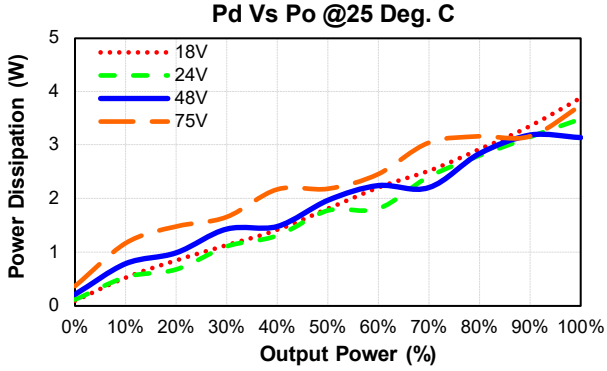
EC5SBW-48S12
Pd Vs Po @25 Deg. C



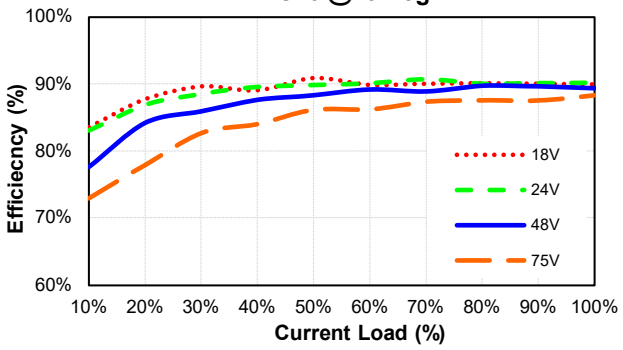
EC5SBW-48S15
Eff Vs Io @25 Deg. C



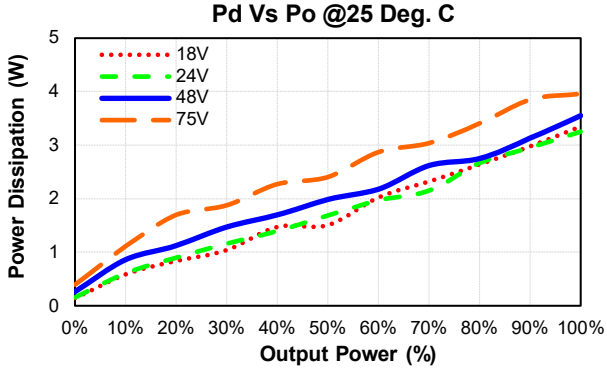
EC5SBW-48S15
Pd Vs Po @25 Deg. C



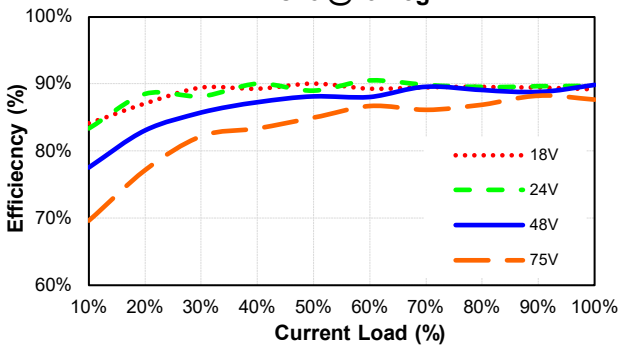
EC5SBW-48D12
Eff Vs Io @25 Deg. C



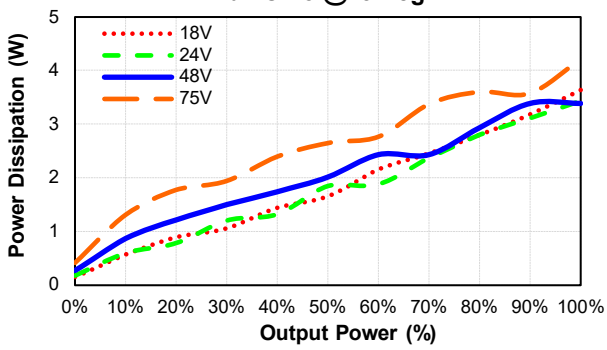
EC5SBW-48D12
Pd Vs Po @25 Deg. C



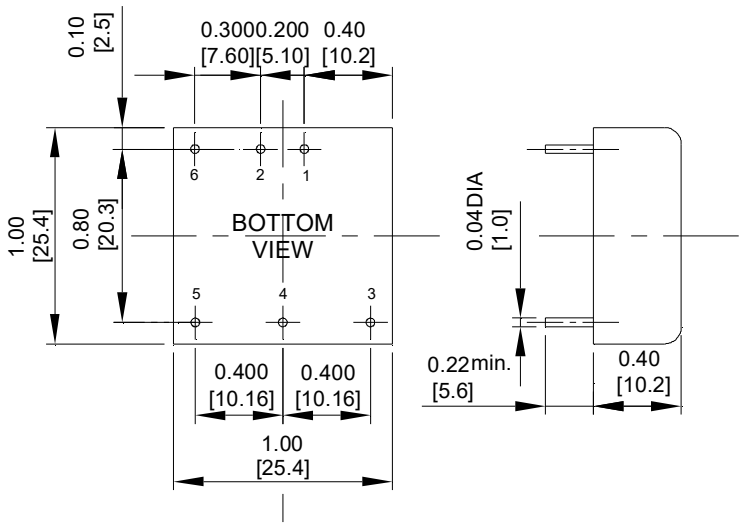
EC5SBW-48D15
Eff Vs Io @25 Deg. C



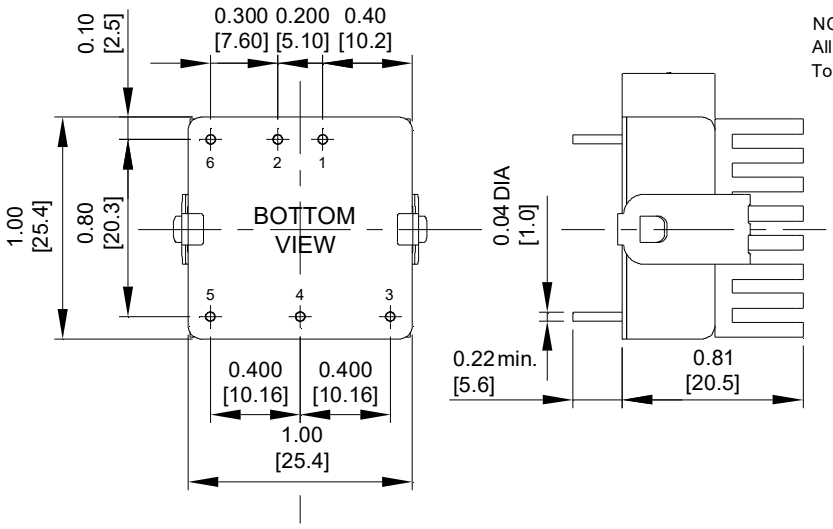
EC5SBW-48D15
Pd Vs Po @25 Deg. C



MECHANICAL SPECIFICATION



Suffix "+SBC100" Type



NOTE:Pin Size is 0.04±0.004 Inch (1.0±0.1 mm)DIA
All Dimensions In Inches (mm)
Tolerances Inches: X.XX= ±0.04 , X.XXX= ±0.010
Millimeters: X.X= ±1.0 , X.XX=±0.25

PIN CONNECTION		
Pin	Single	Dual
1	+Input	+Input
2	-Input	-Input
3	+V Output	+V Output
4	Trim	Common
5	-V Output	-V Output
6	Remote	Remote

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