

DC/DC Wide Input Converter ECW 100 Series



- I/O isolation of 1500 VDC
- Continuous short circuit proof
- Low output ripple and noise
- Low silhouette
- 5-sided metal case
- External output voltage adjust
- Inhibit on/off control
- Industrial standard Half Brick case
- UL, cUL certified

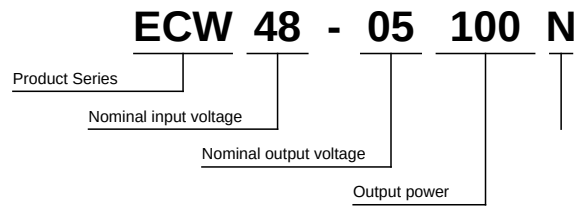


Product Range

Model	Input nominal	Input range	I _{in} @ U _{in} nom.		U _{out}	Output I _{out} max.	power	Efficiency typ.	Max. capacity
			full load	no load					
Single									
ECW24-03100	24Vdc	18...36Vdc	3480mA	50mA	3.3Vdc	20A	66W	79	20'000uF
ECW24-05100	24Vdc	18...36Vdc	5020mA	50mA	5.1Vdc	20A	102W	83	20'000uF
ECW24-12100	24Vdc	18...36Vdc	4880mA	50mA	12Vdc	8.3A	100W	85	8'200uF

ECW24-15100	24Vdc	18...36Vdc	4925mA	50mA	15Vdc	6.70A	100W	85	6'700uF
ECW24-24100	24Vdc	18...36Vdc	4905mA	50mA	24Vdc	4.17A	100W	85	4'000uF
ECW48-03100	48Vdc	36...72Vdc	1720mA	50mA	3.3Vdc	20A	66W	80	20'000uF
ECW48-05100	48Vdc	36...72Vdc	2480mA	50mA	5.1Vdc	20A	102W	84	20'000uF
ECW48-12100	48Vdc	36...72Vdc	2442mA	50mA	12Vdc	8.3A	100W	85	8'200uF
ECW48-15100	48Vdc	36...72Vdc	2463mA	50mA	15Vdc	6.70A	100W	85	6'700uF
ECW48-24100	48Vdc	36...72Vdc	2463mA	50mA	24Vdc	4.17A	100W	85	4'000uF

Nomenclature



Specifications

All values refer to an ambient temperature of 25°C and nominal rated values where nothing else is specified.

Input Specifications

Characteristic		Conditions	min	typ	max	unit
U_{IN}	Input voltage		18 / 36	24 / 48	36 / 72	Vdc
U_{UVLO}	Under voltage lockout					Vdc
	Max. input current at full load		See	product	range	A
	No load input current			50		mA
	Inrush current					A ² s
	Input surge voltage					Vdc

Output Specifications

Characteristic		Conditions	min	typ	max	unit
U_{ACC}	Output voltage accuracy			±1		%
	Output voltage adjust			±10		%
	Line regulation				±0.2	%
	Load regulation				±0.2	%
	Cross regulation					%
	Load transient recovery time	25% / 100% step load change		< 500		us
	Load transient error band					%
	Temperature coefficient			±0.03		%/K
	Ramp up time					ms
	Start up time			5		ms
	Ripple and noise	BW = 20MHz	100 - 240			mVpp
	Current limit		110		140	% Inom

	Over voltage protection		115		140	% Unom
	Short circuit protection					% Inom
	Short circuit characteristic		continuous			

General Specifications

Characteristic		Conditions	min	typ	max	unit
U _{ISO}	Isolation voltage	in/out, in/case, out/case	1500			Vdc
R _{ISO}	Isolation resistance		> 10M			Ohm
C _{ISO}	Isolation capacity					pF
F _{sw}	Switching frequency		500			kHz
	Approvals					
	Safety Approvals	UL / cUL File No, E195564 (only 36-72Vdc input				
	MTBF		> 900'000			h
	Case material		Aluminium			
	Compound material					
	PCB material					
	Weight		95			gr
	Dimensions		57.9 x 61.0 x 12.7			mm
	Soldering infos		275°C for 10			s

EMC Specifications

Characteristic		Conditions	
	EMC conducted	See EMC information	EN55022/11 Class A

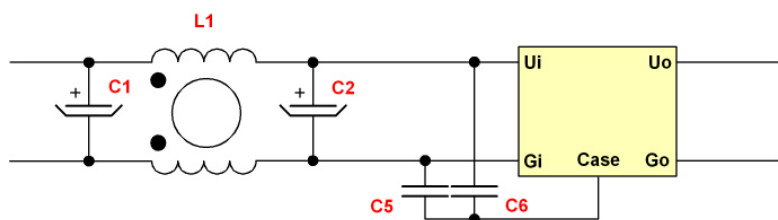
Environmental Specifications

Characteristic		Conditions	min	typ	max	unit
T _{CASE}	Operation temperature		-40...+100			°C
T _{AMB}	Storage temperature		-40...+105			°C
T _{SD}	Thermal shutdown range		Tcase = 100			°C

Own notes

EMC information

No EMC graph available yet, please contact factory



Suggested EMC Filter

C1 220uF / 50V Rubycon 50ZL220M10X16

C2 220uF / 50V Rubycon 50ZL220M10X16

C5 100nF / X7R NA

C6 100nF / X7R NA

L1 2 x 3.3mH B64290-L618-X830 with 2 x 27 turns / 0.71mm

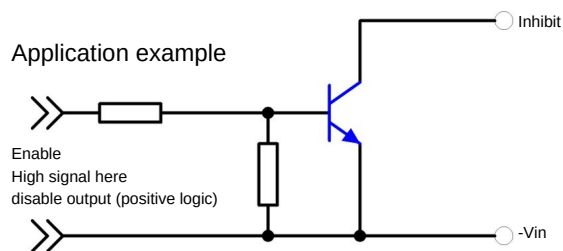
Inhibit

The ECW 100 Series allows the user to switch the module on and off electronically by inhibit on/off feature. The converters are available in "positive logic" (standard) or "negative logic" (option) versions for inhibit on/off.

Logic table (inhibit pin)

Logic state	Negative logic*	Positive logic
Logic low	Module on	Module off
Logic high	Module off	Module on

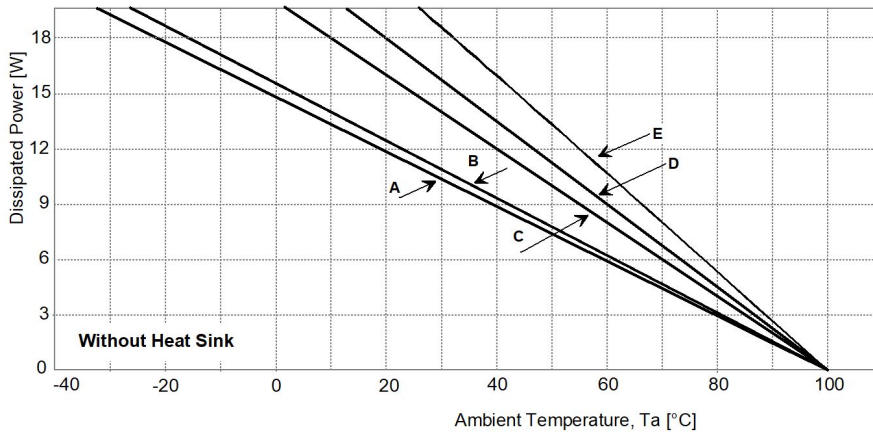
* Suffix "N" to the model number with active low inhibit on/off



Own notes

Derating Formulas

Without Heat Sink: Power Dissipation vs Ambient Temperature and Air Flow for



Where:

Example: $V_{in} = 48V$, $V_{out} = 12V$, $I_{out} = 8.3A$, $T_a = 35^\circ C$, Air Flow = 1m/s

The thermal resistances without heatsink are listed below:

The power dissipation P_d :

$$P_d = P_i - P_o = \frac{P_o \cdot (1 - \eta)}{\eta}$$

Leads to:

$$P_d = \frac{12V \cdot 8.3A \cdot (1 - 0.89)}{0.89} = 12.3W$$

Air flow rate

Typical R_{thca}

natural convection 0.1m/s	7.12 K/W
0.5 m/s	6.21 K/W
1.0 m/s	5.17 K/W
1.5 m/s	4.29 K/W
2.0 m/s	3.64 K/W

The temperature rise ΔT :

$$\Delta T = P_d \cdot R_{thca}$$

And this leads to:

$$\Delta T = 12.3W \cdot 5.17K/W = 63.6K$$

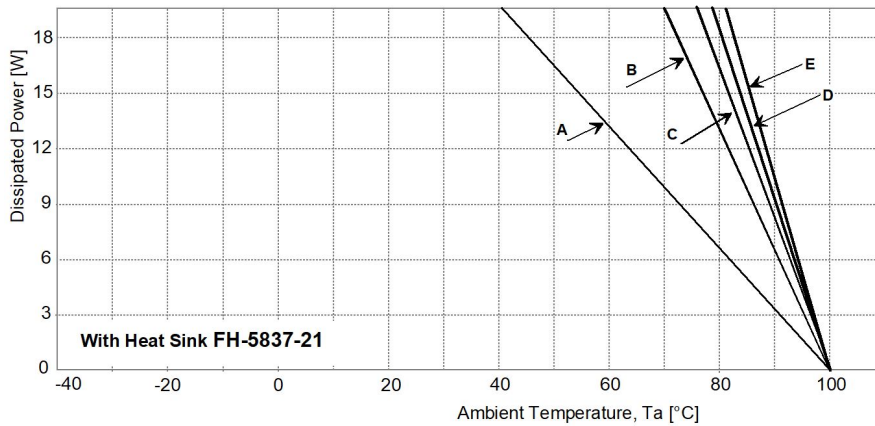
And:

$$T_c = T_a + \Delta T = 35^\circ C + 63.6K = 98.6^\circ C$$

Which is below the max. T_c of $105^\circ C$.

Derating Formulas

With Heat Sink FH-5861-21: Power Dissipation vs Ambient Temperature and Air Flow; Height: 21mm"



Where:

Example: Vin = 38V, Vout = 12V, Iout = 8.3A, Ta = 60°C, Air Flow = 0.1m/s

The thermal resistances with heat sink FH-5861-21 are listed below:

The power dissipation Pd:

$$P_d = P_i - P_o = \frac{P_o \cdot (1 - \eta)}{\eta}$$

Leads to:

$$P_d = \frac{12V \cdot 8.3A \cdot (1 - 0.89)}{0.89} = 12.3W$$

Air flow rate

Typical Rthca

natural convection 0.1m/s	3.00 K/W
0.5 m/s	1.44 K/W
1.0 m/s	1.17 K/W
1.5 m/s	1.04 K/W
2.0 m/s	0.95 K/W

The temperature rise Delta T:

$$\Delta T = P_d \cdot R_{thca}$$

And this leads to:

$$\Delta T = 12.3W \cdot 3K/W = 36.9K$$

And:

$$T_c = T_a + \Delta T = 60^\circ C + 36.9K = 96.9^\circ C$$

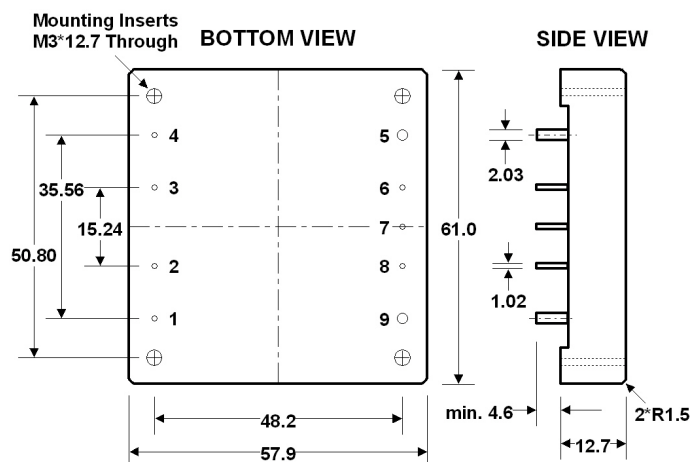
Which is below the max. Tc of 105°C.

Case

Normal tolerance 1/10 ± 0.5 mm, 1/100 ± 0.25 mm; Pin tolerance ± 0.05 mm diameter

NP = No pin, NC = Not connected, NA = Not available for electrical contact, do not connect, (opt) = optional

SINGLE OUTPUT ALU



Pin	Single
1	+Vin
2	on/off
3	Case
4	-Vin
5	-Vout
6	-Sense
7	Trim
8	+Sense
9	+Vout

Cleaning

The modules are cleanable with the today's known and in the electronics industry usually used products. Due to the different cleaning processes and new available products, we highly recommend to do a compatibility test when using the converters the first time.

Own notes

Notice: All statements, technical information, and recommendations related to FABRIMEX's products are based on information believed to be reliable, but the accuracy or completeness thereof is not guaranteed. Before utilizing the product, the user should determine the suitability of the product for its intended use.

Switzerland:
Exista AG - Mettlenbachstrasse 23
CH-8617 Mönchaltorf
Tel: +41 55 253 31 90
www.fabrimex.com / www.exista.ch
info@fabrimex.ch

International:
Please see our distributors
www.fabrimex.com/contact/distribution.html

EXISTA