

ECU 48 - 12 100 x

Product Series

Nominal Input Voltage

Nominal Output Voltage
(3V3 = 3.3V)

Output Power in Watts

blank = positive logic inhibit on/off
N = negative logic inhibit on/off

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

INPUT SPECIFICATIONS

Characteristics		Conditions	min	typ	max	unit
U _{in}	Input voltage 24V	T _c < T _{c max}	9		36	Vdc
	Input voltage 48V		18		72	
I _{nl}	No load current	I _{out} = 0; U _{in} > U _{in off}		50		mA
	Under voltage lockout (U _{in nom} = 24Vdc)	Power up (U _{in nom} = 24Vdc)		8.8		Vdc
		Power down (U _{in nom} = 24Vdc)		8		Vdc
	Under voltage lockout (U _{in nom} = 48Vdc)	Power up (U _{in nom} = 48Vdc)		17		Vdc
		Power down (U _{in nom} = 48Vdc)		16		Vdc
	Full load current	P _{out} = P _{max}	See "product range", page 1			A
	Reversed polarity protection		none			
	Inhibit on/off control (positive logic)	On (open collector referenced to -U _{in})	3.5 Vdc or open circuit			Vdc
		Off (open collector referenced to -U _{in})	< 1.8			Vdc
	Inhibit on/off control (negative logic; add suffix "N" to part number)	On (open collector referenced to -U _{in})	< 1.8			Vdc
		Off (open collector referenced to -U _{in})	3.5 Vdc or open circuit			Vdc

OUTPUT SPECIFICATIONS

Characteristics		Conditions	min	typ	max	unit
U _{acc}	Output voltage accuracy	of nominal output voltage			±1.5	% U _{out}
	Line regulation	I _{out} = I _{out nom}			±0.2	% U _{out}
	Load regulation	0% load up to 100% load			±0.2	% U _{out}
	Load transient recovery time	25% to 100% step load change		500		µs
	Load transient error band			5		% U _{out}
	Temperature coefficient			±0.03		%/°C
U _{out trim}	Output voltage adjustment	see "External output trim" page 7		±10		% U _{out nom}
U _{r n}	Output ripple & noise	Bandwidth 20 Mhz; U _{out} = 3.3 or 5Vdc			100	mVpp
		Bandwidth 20 Mhz; U _{out} = 12 or 15Vdc			150	mVpp
		Bandwidth 20 Mhz; U _{out} = 24Vdc			240	mVpp

continued

Characteristics		Conditions	min	typ	max	unit
	Output capacitance Uin 24/48V		47(50V) / 47(100V)			uF
	Output current limit	see current limit chart, page 4	110		140	% I _{out nom}
	Output short circuit	see short circuit protection graph, page 4	110	130	140	% I _{out}
	Output over voltage protection	of nominal output voltage	115		140	% U _{out}
	Output short circuit protection	hiccup-mode		continuous		

GENERAL SPECIFICATIONS

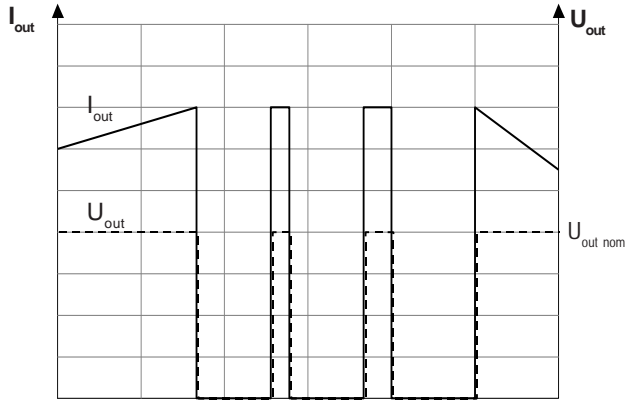
Characteristics		Conditions	min	typ	max	unit
U _{iso}	Isolation voltage	input/output, input/case, output/case	1'500			Vdc
	Isolation resistance	Input to output	100			MOhm
	Input / output capacitance				1'000	pF
	Switching frequency	Fixed		250		kHz
	Approvals		UL / cUL1950			
	Case material		5-sided aluminum case			
	Weight			95		g
	Pinning	see "case" page 7				
	Dimensions	see "case" page 7	57.9 x 61.0 x 12.7			mm
	Soldering temperature	maximum 10s			275	°C

ENVIRONMENTAL SPECIFICATIONS

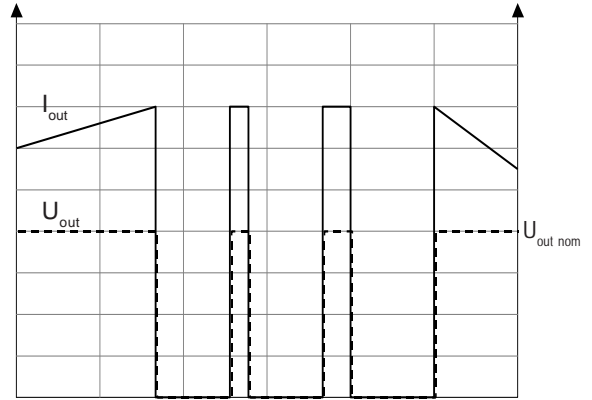
Characteristics		Conditions	min	typ	max	unit
	Vibration (sinusoidal)	Frequency 5-500 Hz Swep 1 Oct/min Duration 30 min (x,y,z axis) non operating	3			Grms
	Shock (half sinus)	Number of pulses 3 in 6 directions Pulse duration 18ms non operating	30			G
T _c	Operating temperatures	Case temperature, see also "Derating" page 5	-40		+100	°C
	Storage temperatures	Ambient temperature	-55		+105	°C
	Thermal shutdown	Case temperature	95	100	105	°C

Typical characteristics

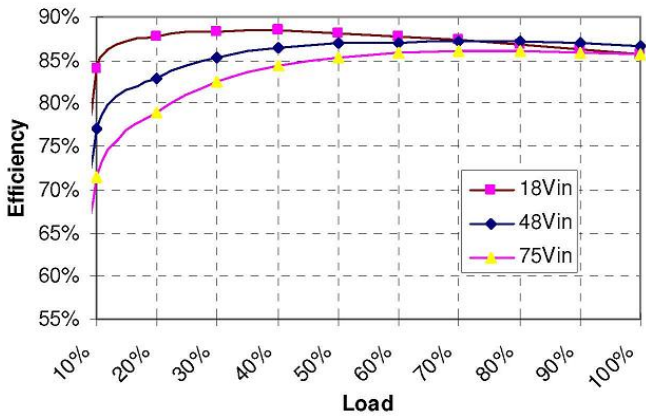
Current limit characteristic



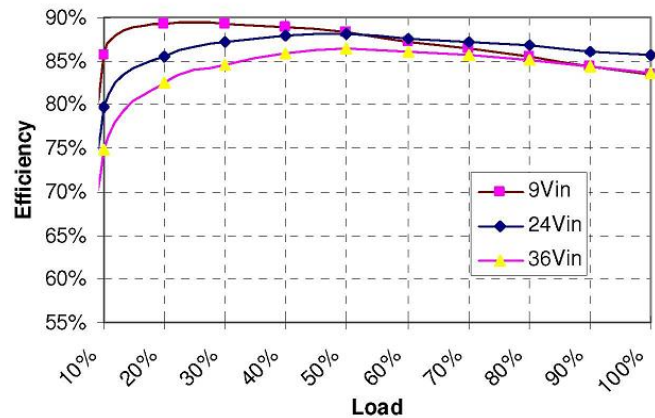
Short circuit protection



Efficiency (typical ECU48-5V0100, U_{in} = 18-72Vdc)



Efficiency (typical ECU24-12100, U_{in} = 9-36Vdc)



Inhibit on/off control

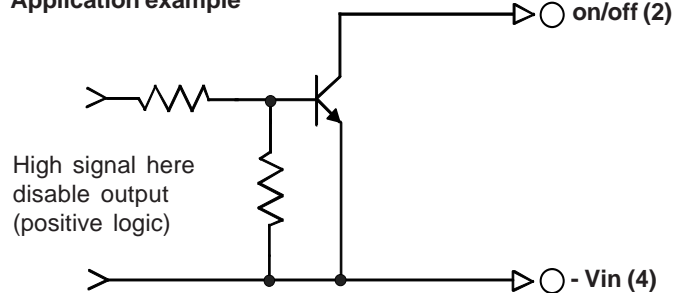
The ECU 75 Watt allows the user to switch the module on and off electronically by inhibit on/off feature. The converters are available in "positive logic" or "negative logic" (option) versions for inhibit on/off.

Logic table

Logic state (Pin 2)	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

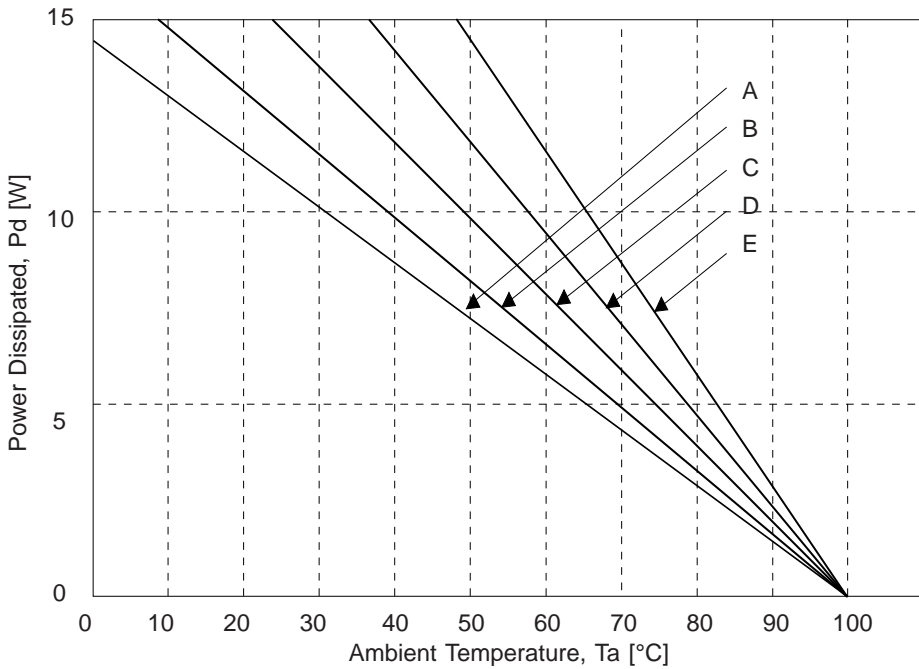
Application example



Derating ECU 75 Watt Series

The operating case temperature range of ECU 100 series is -40°C to +100°C. When operating the ECU 100 series, proper derating or cooling is needed. The following curves are the derating curves of ECU 100 without and with heat sink. Please note that these are relative values in a test environment. Ambient temperature can not be exactly defined in an application, only the case temperature.

Without Heat Sink: Power Dissipated vs Ambient Temperature and Air Flow ECU 100 Watt



- A : Natural Convection 0.1m/s
- B : 0.5m/s
- C : 1.0m/s
- D : 1.5m/s
- E : 2.0m/s

Remark:
 Fabrimec recommends a free space of at least half the converter length above the converter at natural air flow. For the ECU 100 Watt this equals to:

Free space = 30.5mm min.

Where:

The Power Dissipation (Pd):

$$Pd = Pi - Po = Po * (1 - \eta) / \eta$$

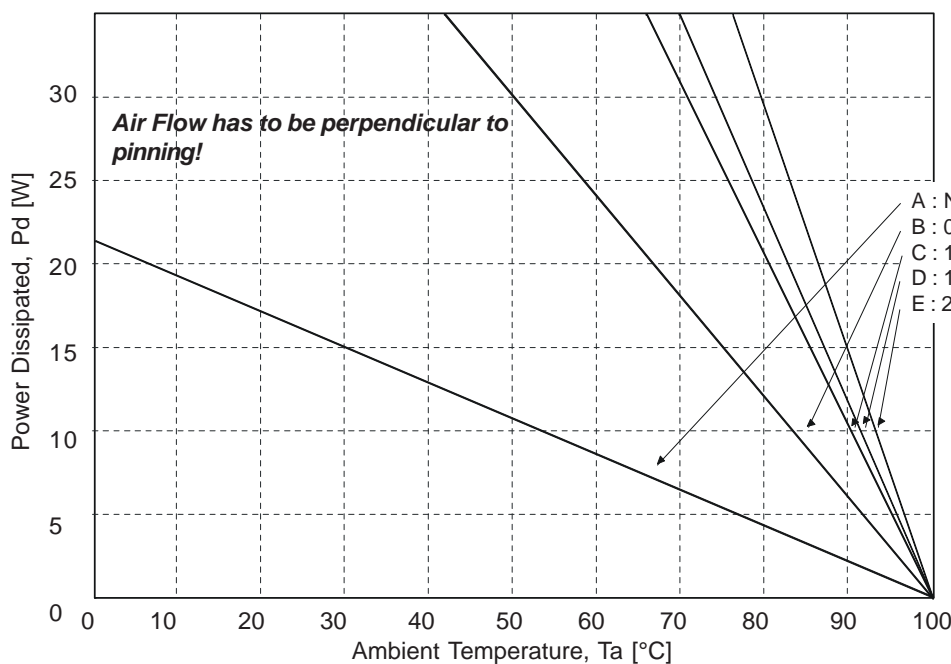
The temperature rise (delta T):

$$\Delta T = Pd * R_{ca}$$

The thermal resistances with out heat sink are listed below:

air flow rate	typical Rca
natural convection 0.1m/s	7.12 K/W
0.5m/s	6.21 K/W
1.0m/s	5.17 K/W
1.5m/s	4.29 K/W
2.0m/s	3.64 K/W

With Heat Sink FH-6158-13: Power Dissipated vs Ambient Temperature; Height: 12.7mm

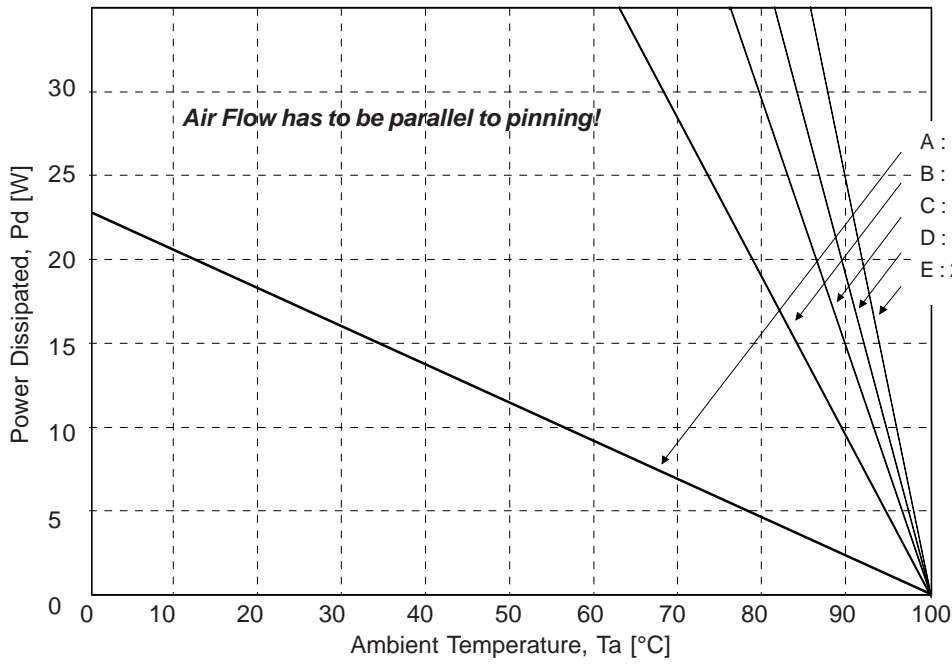


- A : Natural Convection 0.1m/s
- B : 0.5m/s
- C : 1.0m/s
- D : 1.5m/s
- E : 2.0m/s

Remark:
 Fabrimec recommends a free space of at least half the heat sink height above the heat sink at natural air flow. For the FH-6158-13 this equals to:

Free space = 6.5 mm min.

With Heat Sink FH-5861-21: Power Dissipated vs Ambient Temperature; Height: 21mm

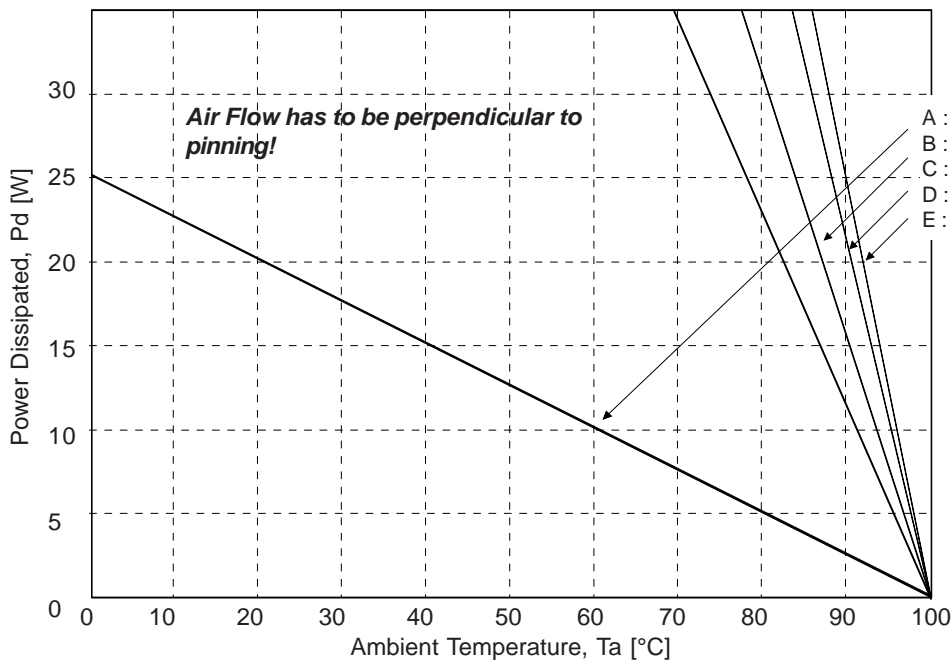


Remark:

Fabrimex recommends a free space of at least half the heat sink height above the heat sink at natural air flow. For the FH-5861-21 this equals to:

Free space = 10.5mm min.

With Heat Sink FH-6158-25: Power Dissipated vs Ambient Temperature; Height: 25.4mm



Remark:

Fabrimex recommends a free space of at least half the heat sink height above the heat sink at natural air flow. For the FH-6158-25 this equals to:

Free space = 12.5mm min.

