

Open Frame DC/DC Converter OCW 15 Watt 'SB' Series



DC/DC converter module with input to output isolation of 2250 VDC • Pi-filter at input • Continuous short circuit proof • Very high efficiency • Low output ripple and noise • Low silhouette • Open frame • External output voltage adjust • Remote on/off control • 1x1.1" case

DC/DC Konverter-Modul mit galvanischer Trennung Eingang / Ausgang von 2250 VDC • Pi-Filter am Eingang • Dauerkurzschlussfest • Sehr hoher Wirkungsgrad • Gute Werte von Rippel und Noise • Geringe Bauhöhe • Open Frame • Externer Ausgangsspannungsabgleich • Inhibit • 1x1.1" Gehäuse

Module convertisseur DC/DC avec séparation galvanique entrée/sortie 2250 VDC • Filtre d'entrée • Protection contre courts-circuits permanents • Rendement très élevé • Très faible ondulation résiduelle de sortie • Hauteur réduite • Boîtier "open frame" • Ajustement externe de la tension de sortie • Fonction inhibit • Boîtier au 1x1.1"

Product range

Typenübersicht

Sommaire des types

PART NUMBER	INPUT VOLTAGE		INPUT CURRENT		OUTPUT		EFFICIENCY
	Nominal	Range	max. @ full load	No Load	Voltage	Current	Typical
OCW24-0315SB	24 VDC	18...36 VDC	0.655 A	30 mA	3.3 VDC	4 A	84%
OCW24-0515SB	24 VDC	18...36 VDC	0.735 A	30 mA	5 VDC	3 A	85%
OCW24-1215SB	24 VDC	18...36 VDC	0.718 A	40 mA	12 VDC	1.25 A	87%
OCW24-1515SB	24 VDC	18...36 VDC	0.718 A	40 mA	15 VDC	1 A	87%
OCW48-0315SB	48 VDC	36...72 VDC	0.320 A	30 mA	3.3 VDC	4 A	86%
OCW48-0515SB	48 VDC	36...72 VDC	0.359 A	40 mA	5 VDC	3 A	87%
OCW48-1215SB	48 VDC	36...72 VDC	0.351 A	30 mA	12 VDC	1.25 A	89%
OCW48-1515SB	48 VDC	36...72 VDC	0.351 A	30 mA	15 VDC	1 A	89%

OCW 24 - 03 15 SB X

Product Series

Nominal Input Voltage

Nominal Output Voltage
(03 = 3.3V)

Output Power in Watts

1x1.1" Case

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

Specifications

Spezifikationen

Spécifications

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	T _c < T _{c,max} ; OCW 24-...SC	18	24	36	Vdc
		T _c < T _{c,max} ; OCW 48-...SC	36	48	72	Vdc
	Input transients	maximum 100ms (U _{in} = 18-36Vdc)		50		Vdc
		maximum 100ms (U _{in} = 36-72Vdc)		100		Vdc
I _{nl}	No load current	I _{out} = 0; U _{in} > U _{in,off}	See "product range", page 1			mA
	Remote off current	Remote "off" activated		4	10	mA
U _{in,off}	Under voltage lockout (U _{in,nom} = 24Vdc)	Power up	16.5	17	17.5	Vdc
		Power down	15.5	16	16.5	Vdc
		Under voltage lockout hysteresis		1.5		Vdc
	Under voltage lockout (U _{in,nom} = 48Vdc)	Power up	33	34	34.5	Vdc
		Power down	31.5	32.5	33	Vdc
		Under voltage lockout hysteresis		1.5		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})	open circuit or > 5.5VDC			Vdc
		Off (open collector referenced to -U _{in})	< 1.2 VDC			Vdc
	Inhibit on/off control (negative logic; add suffix "N" to part number)	On (open collector referenced to -U _{in})	< 1.2 VDC			Vdc
		Off (open collector referenced to -U _{in})	open circuit or > 5.5VDC			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	us
	Load transient error band			5		% U _{out}
	Start-up time	Connection of input and until U _{out} = 90% U _{out, nom}		6	10	ms
		From on/off control		20		ms
	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)		75		mVpp

continued

Characteristics		Conditions	min	typ	max	unit
Max. output capacitance		OCW...0315SB ($I_{out} = 4A$)		4'000		μF
		OCW...0515SB ($I_{out} = 3A$)		3'000		μF
		OCW...1215SB ($I_{out} = 1.25A$)		1'250		μF
		OCW...1515SB ($I_{out} = 1A$)		1'000		μF
Output current limit	see current limit chart, page 5	110	125	140	% $I_{out nom}$	
Output short circuit	see short circuit protection chart, page 5		130		% $I_{out nom}$	
Output over voltage protection		OCW...0315SB ($U_{out} = 3.3V$)		3.9		V
		OCW...0515SB ($U_{out} = 5V$)		6.2		
		OCW...1215SB ($U_{out} = 12V$)		15		
		OCW...1515SB ($U_{out} = 15V$)		18		
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	2'250			Vdc
	Isolation resistance	Input to output	10			MOhm
	Input / output capacitance				560	pF
	Switching frequency	Fixed		400		kHz
	Approvals		Meets UL / cUL60950, EN60950			
	Case material		Open frame			
	Weight			9		g
	Pinning	see "case" page 8				
	Dimensions	see "case" page 8	27.9 x 24.4 x 9.1			mm
	Soldering temperature	see soldering graph, page 7			260	°C

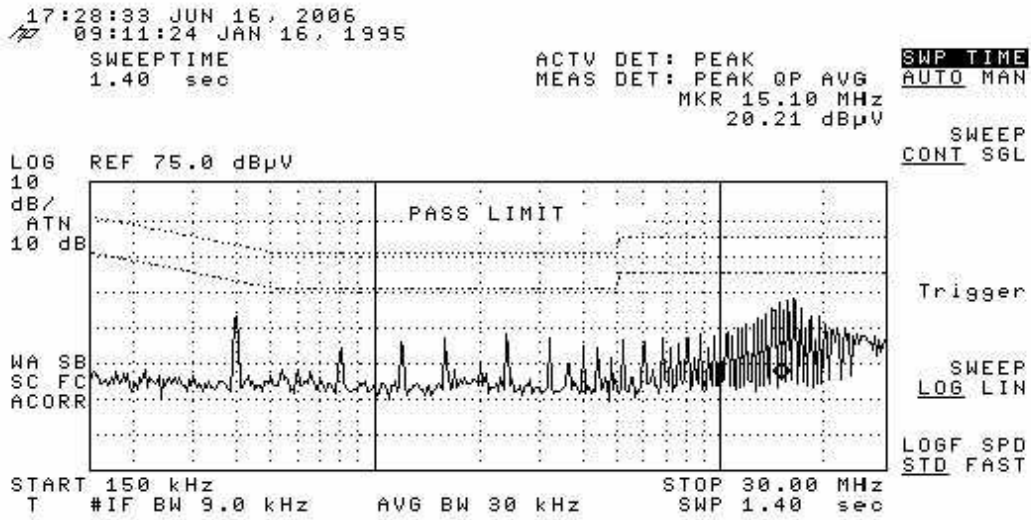
EMC SPECIFICATIONS

Characteristics		Conditions	min	typ	max	unit
	EMC conducted	EN 55022/11 See "EMC information" page 4	Class B			

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	Ambient temperature, see also "Derating" page 6	-40		+85	°C
	Storage temperatures	Ambient temperature	-40		+125	°C

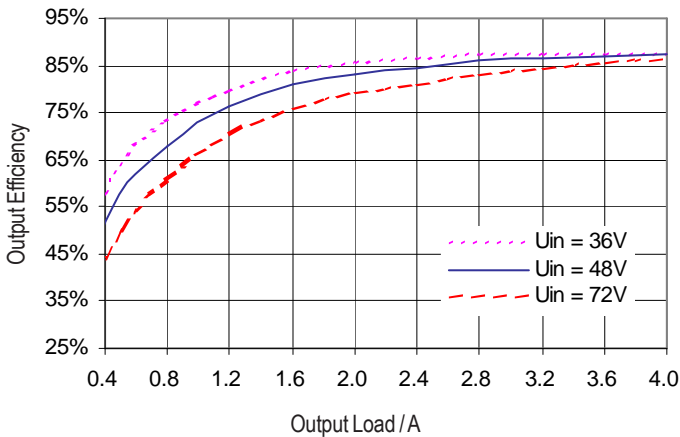
EMC information conducted, EN 55022/11 Class B



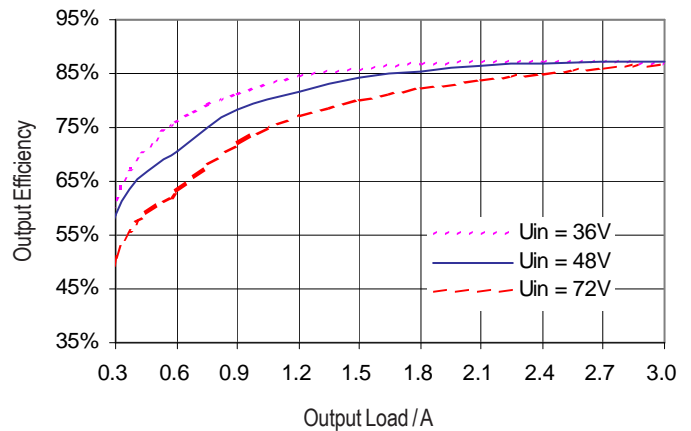
EMC test conducted at full load. No external components are needed. For further EMC requirements, please contact your local distributor / representative or contact Fabrimex directly.

Typical characteristics

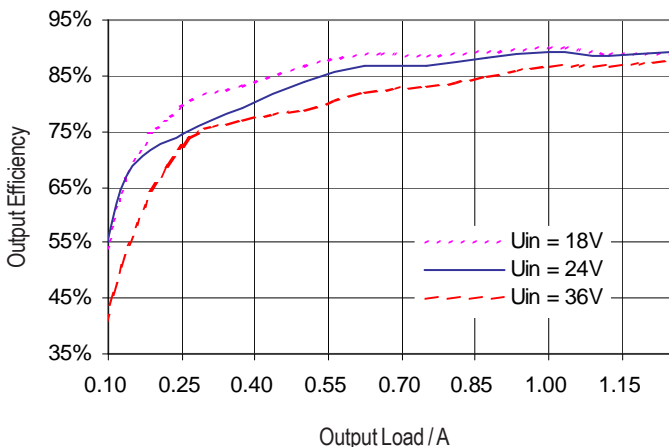
Efficiency $U_{out} = 3.3Vdc$ (typical)



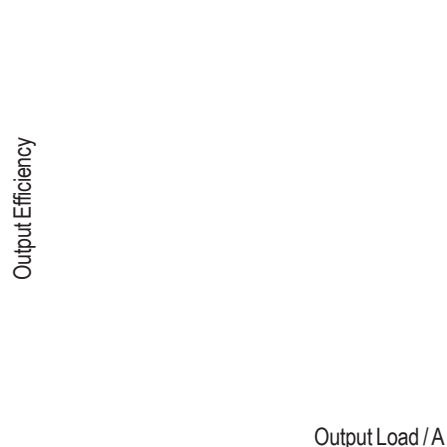
Efficiency $U_{out} = 5.0Vdc$ (typical)



Efficiency $U_{out} = 12.0Vdc$ (typical)

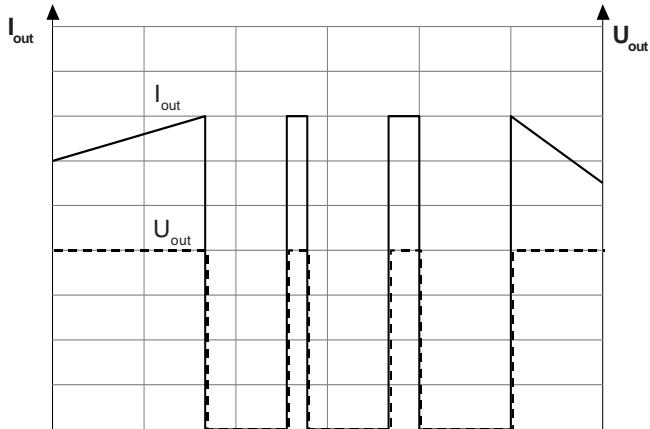


Efficiency $U_{out} = 15.0Vdc$ (typical)

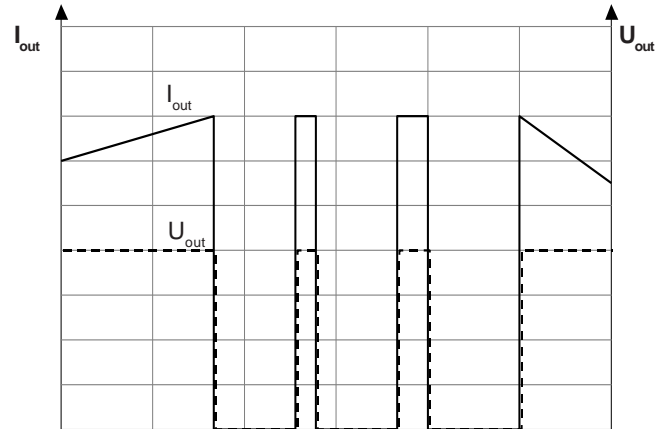


Typical characteristics

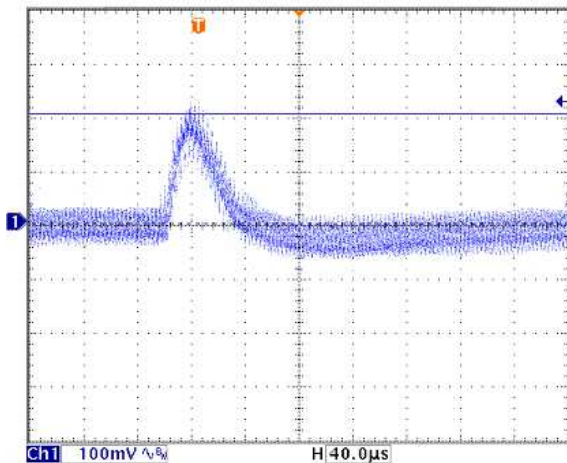
Current limit characteristic



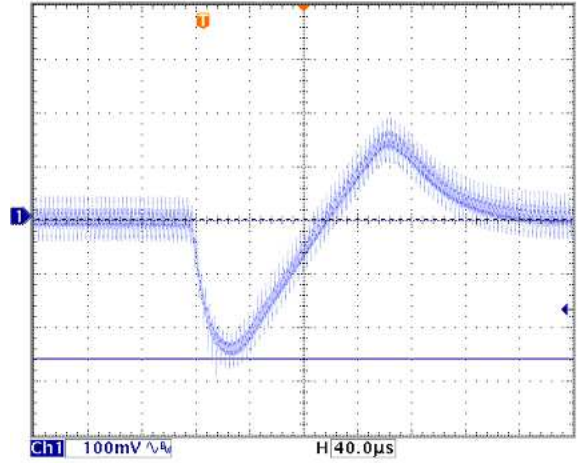
Short circuit protection



Dynamic load response OCW24-0515SB (typical)

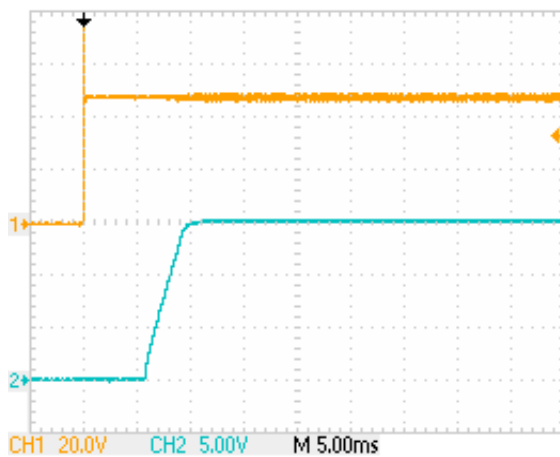


Dynamic load response: 100% -> 25%, U_{in} : 24V



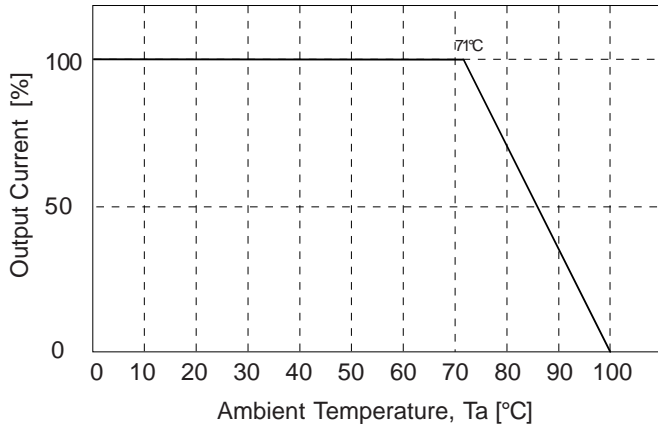
Dynamic load response: 25% -> 100%, U_{in} : 24V

Start-up time (typical)



Switch-on at 100% load

Derating OCW 25 Watt Series



The operating ambient temperature range of OCW 15SB series is -40°C to $+100^{\circ}\text{C}$. When operating the OCW 15SB series, proper derating or cooling is needed. The curves are the derating curves of the OCW 15SB without heat sink at natural convection (0.1 m/s) and at forced air flow of 0.5m/s.

Please note that these are relative values in a defined environment. Ambient temperature can not be exactly defined in an application.

Inhibit on/off control

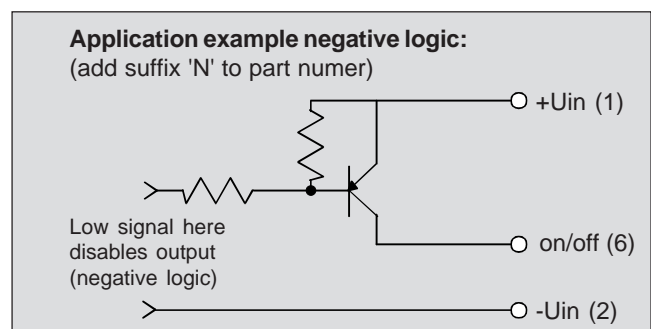
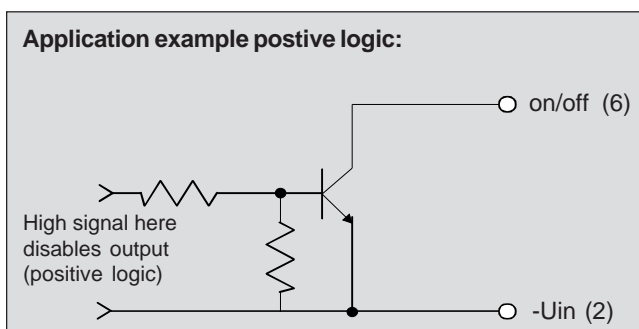
The OCW 15SB allows the user to switch the module on and off electronically by inhibit on/off feature. The converters are available in "positive logic" or "negative logic" (option) versions for inhibit on/off. The signal level (control voltage) of the remote on/off pin is defined with respect to ground.

If not using the remote on/off pin, leave the pin open and module will be on (positive logic).

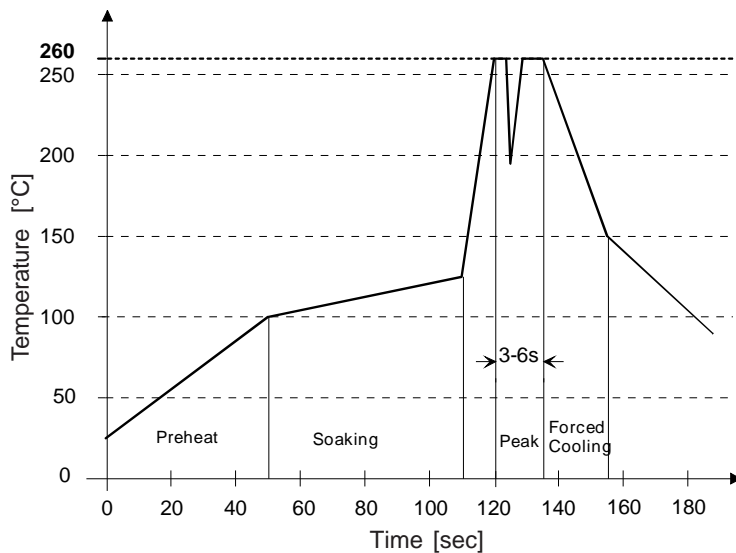
Logic table

Positive logic	Logic Compatibility... CMOS or Open Collector TTL, ref. to $-V_{in}$	Module on Module off	$> 5.5\text{VDC}$ or Open Circuit $< 1.2\text{VDC}$
Negative logic	Suffix "N" to the model number with negative logic remote ON/OFF	Module on Module off	$< 1.2\text{VDC}$ $> 5.5\text{VDC}$ or open

If the control voltage exceeds 5.5Vdc then an external protective circuit has to be used similar to the following examples.



Soldering Information



Limits:

Preheat: Ramp up rate during preheating is 1.4°C/sec; from 50°C to 100°C.

Soaking: Ramp up rate during soaking is 0.5°C/sec; from 100°C to 130°C (60 ± 20sec).

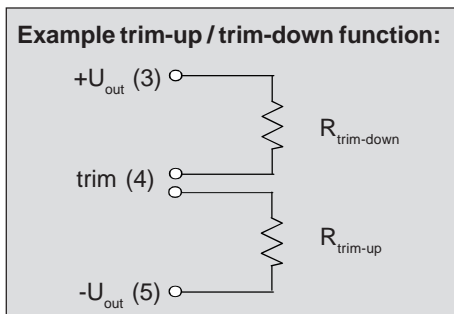
Peak: Peak temperature is 260°C and maximum 3-6 sec above 250°C is allowed.

Cooling: Ramp down rate during forced cooling is -10°C/sec from 260°C to 150°C.

External output voltage trim

For the OCW 15SB series, the trim function allows the user to adjust the output voltage between ±10% by connecting an external resistor either between the trim pin and the common pin (trim-up) or the trim pin and the +U_{out} pin (trim-down).

Connection:



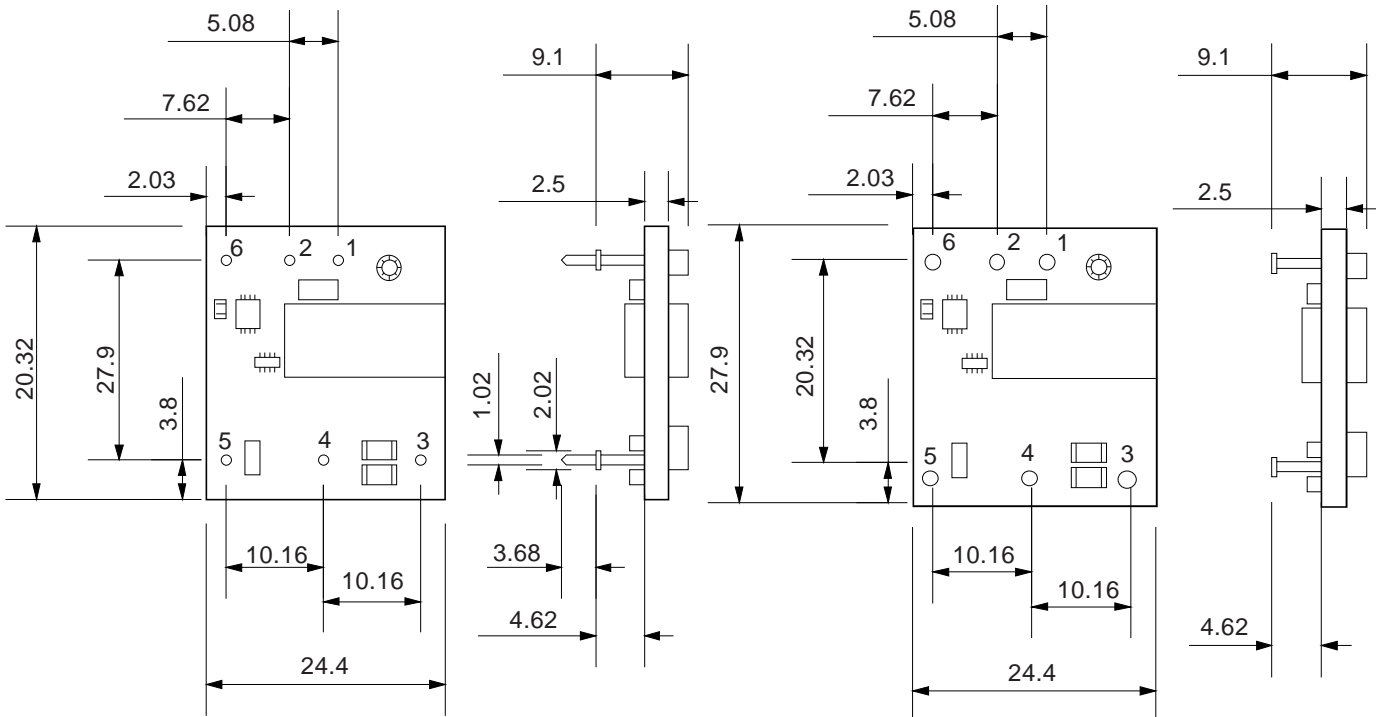
R_{trim} Calculation (where U_{out} is desired output voltage):

U _{out-nom}	R _{trim-up}	R _{trim-down}
3.3 Vdc	$R_{trim-up} = \frac{12.75}{(U_{out} - 3.3)} - 2.05$ [kOhm]	$R_{trim-down} = \frac{(5.11 \times V_o - 12.75)}{(U_{out} - 3.3)} - 2.05$ [kOhm]
5.0 Vdc	$R_{trim-up} = \frac{12.75}{(U_{out} - 5)} - 2.05$ [kOhm]	$R_{trim-down} = \frac{(5.11 \times V_o - 12.75)}{(U_{out} - 5)} - 2.05$ [kOhm]
12.0 Vdc	$R_{trim-up} = \frac{24.95}{(U_{out} - 12)} - 5.11$ [kOhm]	$R_{trim-down} = \frac{(10 \times V_o - 24.95)}{(U_{out} - 12)} - 5.11$ [kOhm]
15.0 Vdc	$R_{trim-up} = \frac{24.95}{(U_{out} - 15)} - 5.11$ [kOhm]	$R_{trim-down} = \frac{(10 \times V_o - 24.95)}{(U_{out} - 15)} - 5.11$ [kOhm]

View from bottom; Normal tolerance $1/10 \pm 0.5$ mm, $1/100 \pm 0.25$ mm; Pin tolerance 0.5 mm diameter

Standard Package

SMD Package



Pin	Function
1	+Vin
2	-Vin
3	+Vout
4	trim
5	-Vout
6	on/off

Cleaning

Waschen

Lavage

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.

Die Module sind waschbar mit den heute bekannten und in der Elektronikindustrie üblichen Reinigungsmitteln.

Bedingt durch die verschiedenen Reinigungsprozesse und neu auf den Markt kommende Mittel, raten wir dringend beim Ersteinsatz der Konverter eine Verträglichkeitsprüfung vorzunehmen.

Les modules sont lavables avec les solvants couramment utilisés dans l'industrie électronique.

Dû aux différents processus de lavage et aux nouveaux détergents disponibles sur le marché, il est strictement recommandé de faire un test de compatibilité avant la première utilisation.

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:
 FABRIMEX AG • Techcenterstrasse 2
 CH-8608 Bubikon
 Tel: +41-55-253 31 90 • Fax: +41-55-253 31 91
 www.fabrimex.com

FABRIMEX
 POWER SUPPLIES

 **powerfactor**
 01869 278585 www.powerfactor.co.uk