FABRIMEX POWER SUPPLIES
CH-8608 Bubikon/Switzerland

FABRIMEX
POWER SUPPLIES

Certified
Management-System
SQS
ISO 9001
Reg. Nr. 12666

DC/DC Converter
ECW 25 Watt 'SC' Series

DC/DC converter module with input to output isolation of 1500 VDC • Pi-filter at input • Continuous short circuit proof • Very high efficiency • Low output ripple and noise • Low silhouette • External output voltage adjust • Remote on/off control • 2x1.6" case

DC/DC Konverter-Modul mit galvanischer Trennung Eingang / Ausgang von 1500 VDC • Pi-Filter am Eingang • Dauerkurzschlussfest • Sehr hoher Wirkungsgrad • Gute Werte von Rippel und Noise • Geringe Bauhöhe • Externer Ausgangs-spannungsabgleich • Inhibit • 2x1.6" Gehäuse

Module convertisseur DC/DC avec séparation galvanique entrée/sortie 1500 VDC • Filtre d'entrée • Protection contre courts-circuits permanents • Rendement tres élevé • Très faible ondulation résiduelle de sortie • Hauteur réduite • Ajustement externe de la tension de sortie • Fonction inhibit • Boîtier au 2x1.6"

Product range — Typenübersicht — Sommaire des types

PART NUMBER	INPUT VOLTAGE		INPUT CURRENT		OUTPUT		EFFICIENCY
	Nominal	Range	@ U_{in} nom	No Load	Voltage	Current	Typical
ECW24-1V825SC	24 VDC	18...36 VDC	0.723 A	70 mA	1.8 VDC	8 A	83%
ECW24-2V525SC	24 VDC	18...36 VDC	0.970 A	70 mA	2.5 VDC	8 A	86%
ECW24-3V325SC	24 VDC	18...36 VDC	0.940 A	70 mA	3.3 VDC	6 A	88%
ECW24-0525SC	24 VDC	18...36 VDC	1.170 A	70 mA	5.0 VDC	5 A	89%
ECW24-1225SC	24 VDC	18...36 VDC	1.136 A	50 mA	12.0 VDC	2 A	88%
ECW24-1525SC	24 VDC	18...36 VDC	1.136A	50 mA	15.0 VDC	1.6 A	88%
ECW48-1V825SC	48 VDC	36...72 VDC	0.353 A	50 mA	1.8 VDC	8 A	85%
ECW48-2V525SC	48 VDC	36...72 VDC	0.479 A	50 mA	2.5 VDC	8 A	87%
ECW48-3V325SC	48 VDC	36...72 VDC	0.465 A	50 mA	3.3 VDC	6 A	89%
ECW48-0525SC	48 VDC	36...72 VDC	0.572 A	50 mA	5.0 VDC	5 A	91%
ECW48-1225SC	48 VDC	36...72 VDC	0.562 A	30 mA	12.0 VDC	2 A	89%
ECW48-1525SC	48 VDC	36...72 VDC	0.562 A	30 mA	15.0 VDC	1.6 A	89%

Nomenclature Nomenklatur Nomenclature

ECW 24 - 3V3 25 SC x

Product Series

Nominal Input Voltage

Nominal Output Voltage (3V3 = 3.3V)

Output Power in Watts

2x1.6" 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	$T_c < T_{c\,max}$; ECW 24-....SC	18	24	36	Vdc
		$T_c < T_{c\,max}$; ECW 48-....SC	36	48	72	Vdc
	Input transients	maximum 100ms (Uin = 18-36Vdc)		50		Vdc
		maximum 100ms (Uin = 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_{innom}= 24Vdc)	Power up	16.5	17	17.5	Vdc
		Power down	15.5	16	16.5	Vdc
		Under voltage lockout hysteresis		0.9		Vdc
	Under voltage lockout (U_{innom}= 48Vdc)	Power up	33	34	34.5	Vdc
		Power down	31.5	32	33	Vdc
		Under voltage lockout hysteresis		1.8		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 > 3.5VDC			Vdc
		Off (open collector referenced to $-U_{in}$)	< 1.8 VDC			Vdc
	Inhibit on/off control (negative logic; add suffix "N" to part number)	On (open collector referenced to $-U_{in}$)	< 1.8 VDC			Vdc
		Off (open collector referenced to $-U_{in}$)	open circuit or > 3.5VDC			Vdc

OUTPUT SPECIFICATIONS

Characteristics		Conditions	min	typ	max	unit
U_{acc}	Ouput voltage accuracy	of nominal output voltage			±1	% U_{out}
	Line regulation	$I_{out} = I_{out\,nom}$			±0.5	% U_{out}
	Load regulation	0% load up to 100% load			±0.5	% U_{out}
	Load transient recovery time	25% to 100% step load change		250		us
	Load transient error band			5		% U_{out}
	Start-up time	Connection of input and until U_{out} = 90% $U_{out\,nom}$		5.5		ms
		From on/off control		5.5		ms
	Temperature coefficient			±0.02		%/°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} = 1.8, 2.5, 3.3 or 5Vdc			75	mVpp
		U_{out} =12 or 15Vdc			100	mVpp

continued

Characteristics		Conditions	min	typ	max	unit
	Max. output capacitance	ECW..-1V825 / 2V525SC (I_{out} = 8A)		8'000		uF
		ECW..-3V325SC (I_{out} = 6A)		6'000		uF
		ECW..-0525SC (I_{out} = 5A)		5'000		uF
		ECW..-1225SC (I_{out} = 2A)		2'000		uF
		ECW..-1525SC (I_{out} = 1.6A)		1'600		uF
	Output current limit	see current limit chart, page 5	110	130	150	% $I_{out\ nom}$
	Output short circuit	see short circuit protection chart, page 5		130		% $I_{out\ nom}$
	Output over voltage protection	ECW..-1V825/2V525SC (V_{out}=1.8 / 2.5V) ECW..-3V325SC (V_{out} = 3.3V) ECW..-0525SC (V_{out} = 5.0V) ECW..-1225SC (V_{out} = 12V) ECW..-1525SC (V_{out} = 15V)		3.3 3.9 6.2 15 18		V
	Output short circuit protection	hiccup-mode		continous		

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		300		kHz
	Approvals		Meets UL / cUL60950, EN60950			
	Case material		Copper case			
	Wheigt			25		g
	Pinning	see "case" page 8				
	Dimensions	see "case" page 8	50.8 x 40.6 x 11.4			mm
	Soldering temperature	see soldering graph, page 7			260	°C

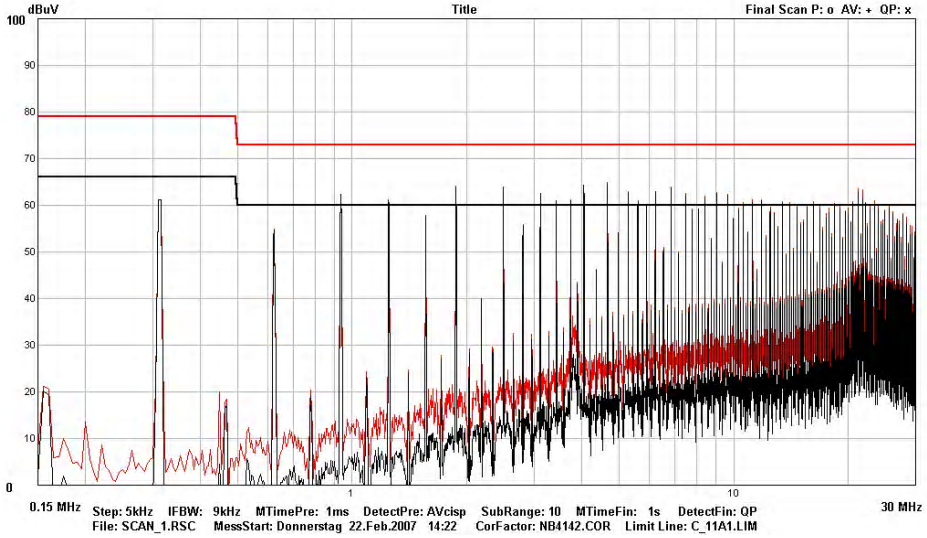
EMC SPECIFICATIONS

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

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	-55		+125	°C
	Thermal shutdown	Case temperature		110		°C

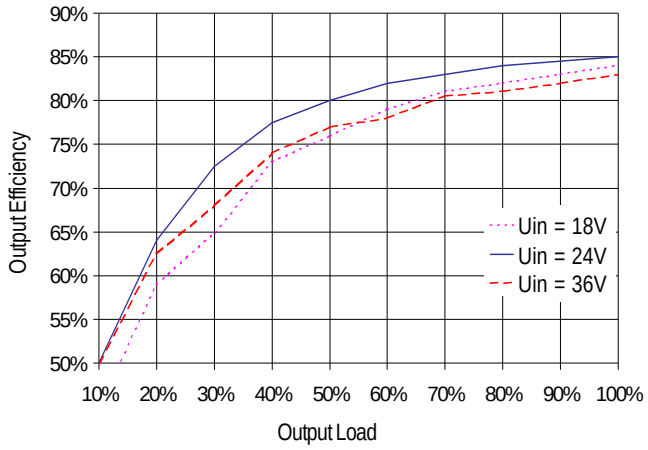
EMC information conducted, EN 55022/11 Class A



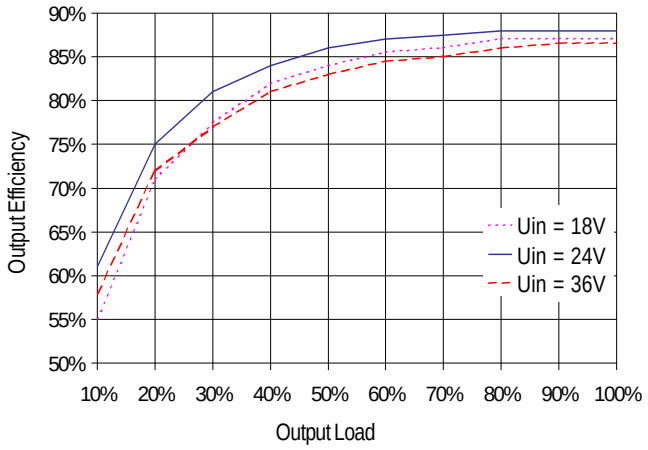
EMC test conducted at full load. No external components are needed. For further EMC requirements, please contact your local distributor / representative or contact Fabrimex directly.

Typical characteristics

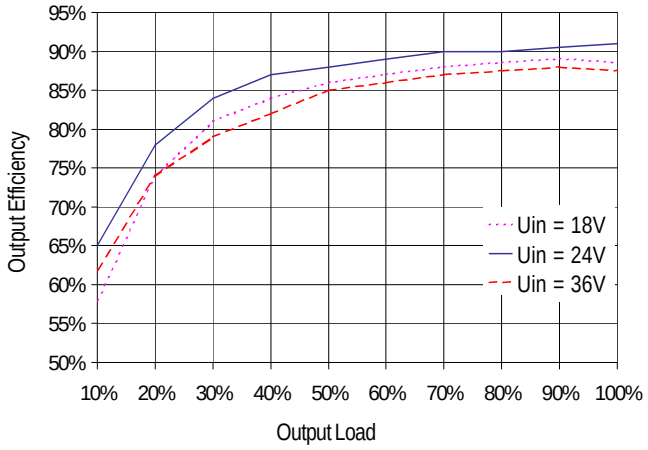
Efficiency U_{out} = 1.8Vdc (typical)



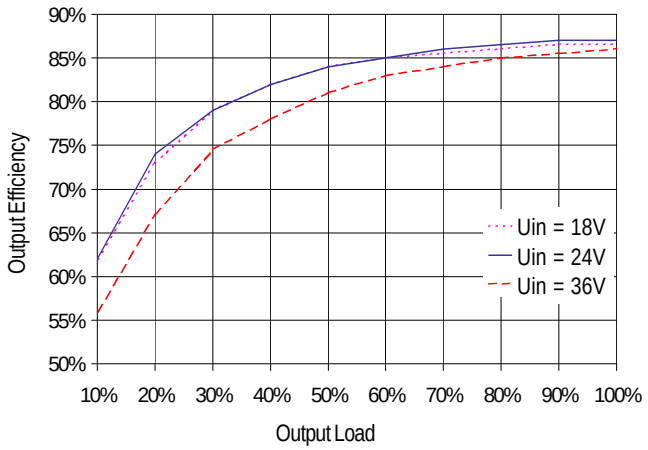
Efficiency U_{out} = 3.3Vdc (typical)



Efficiency U_{out} = 5.0Vdc (typical)

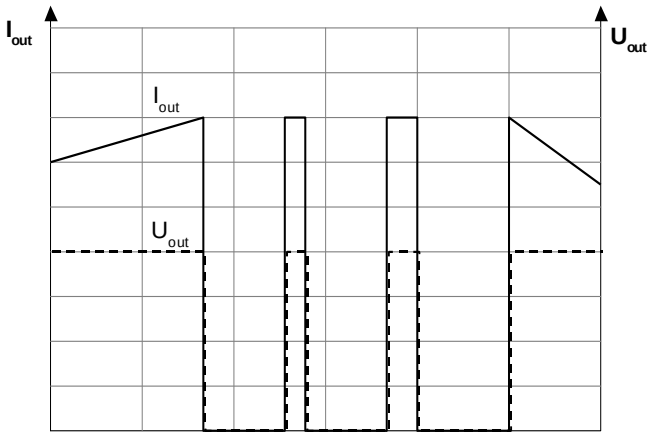


Efficiency U_{out} = 12.0Vdc (typical)

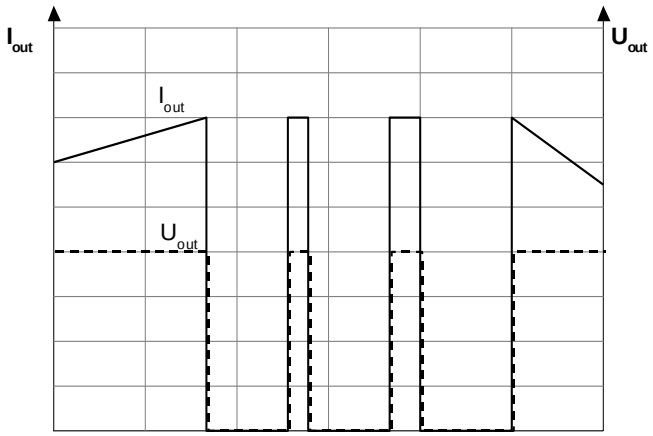


Typical characteristics

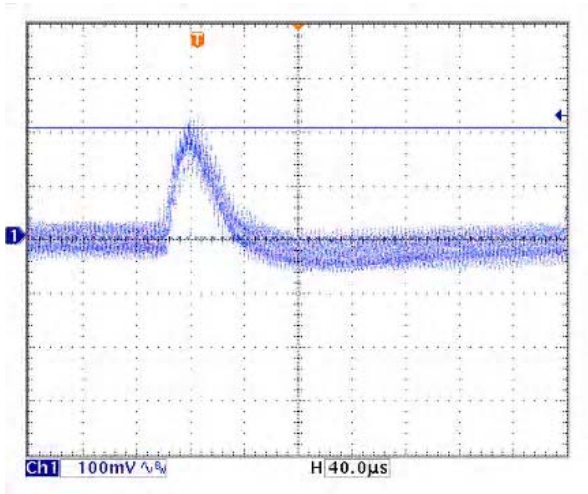
Current limit characteristic



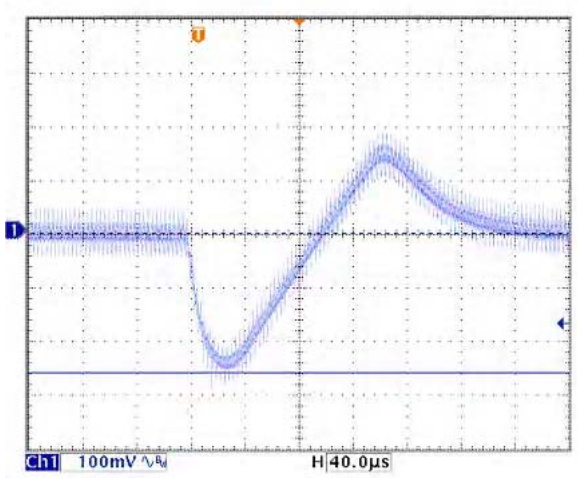
Short circuit protection



Dynamic load response ECW24-0525SC (typical)

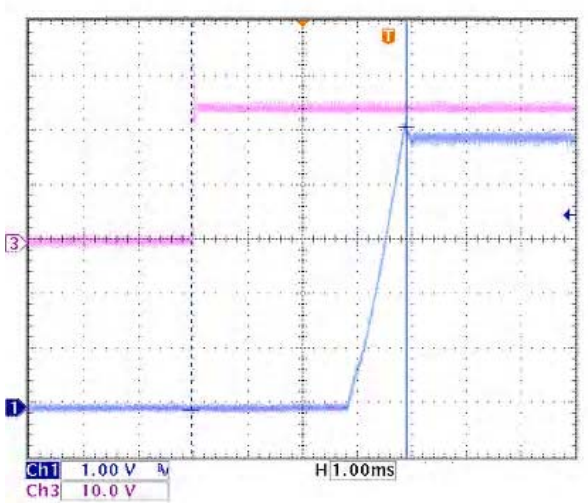


Dynamic load response: 100% -> 25%, Uin: 24V



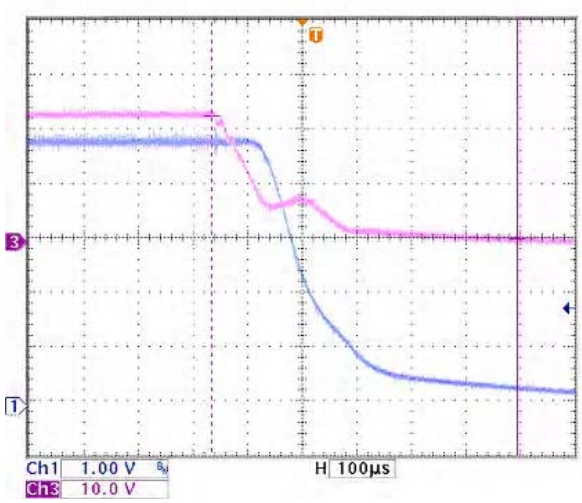
Dynamic load response: 25% -> 100%, Uin: 24V

Start-up time (typical)



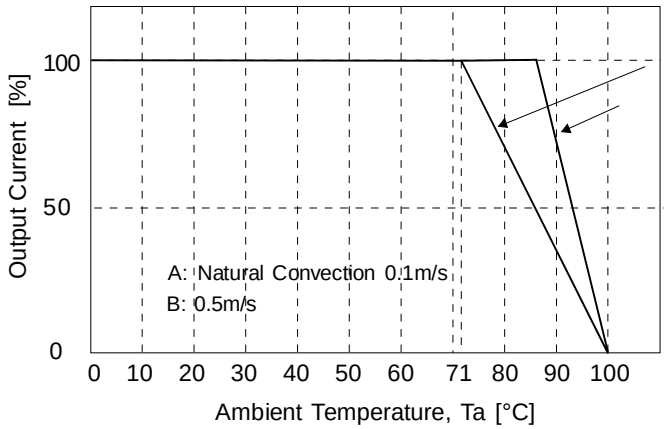
Switch-on at 100% load

Shut-down time (typical)



Switch-off at 100% load

Derating ECW 25 Watt 'SC' Series



The operating ambient temperature range of ECW 25SC series is -40°C to +100°C. When operating the ECW 25SC series, proper derating or cooling is needed. The curves are the derating curves of the ECW 25SC 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. For verification purposes, the maximum case temperature may not exceed 100°C anywhere.

Inhibit on/off control

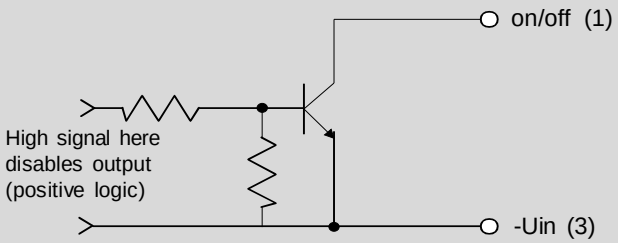
The OCW 25SC allows the user to switch the module on and off electronically by inhibit on/off feature. The converters are available in "positive logic" or "negative logic" (option) versions for inhibit on/off. The signal level (control voltage) of the remote on/off pin is defined with respect to ground.
If not using the remote on/off pin, leave the pin open and module will be on (positive logic).

Logic table

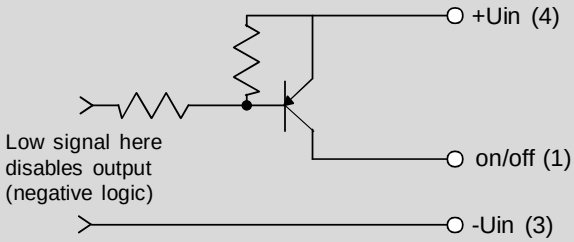
Positive logic	Logic Compatibility... CMOS or Opetn Collector TTL, ref. to -Vin	Module on Module off	> 3.5VDC or Open Circuit < 1.8VDC
Negative logic	Suffix "N" to the model number with negative logic remote ON/OFF	Module on Module off	< 1.8VDC > 3.5VDC or open

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

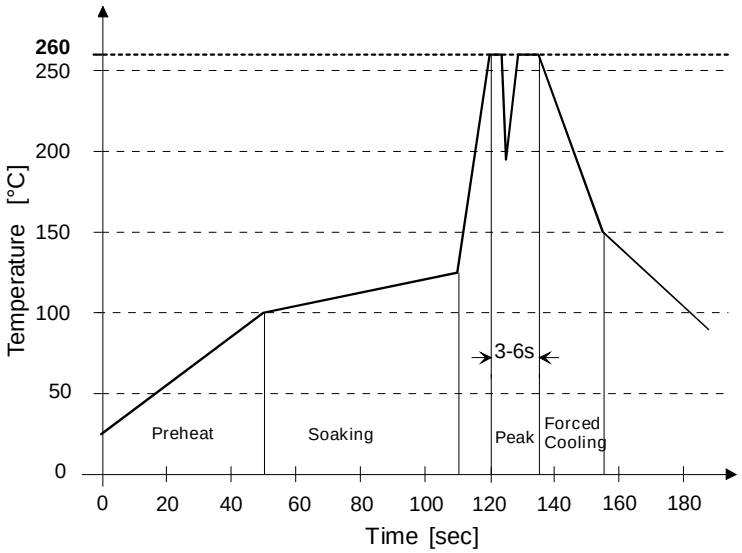
Application example postive logic:



Application example negative logic:
(add suffix 'N' to part numer)



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 ro 130°C (60 ± 20sec).

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

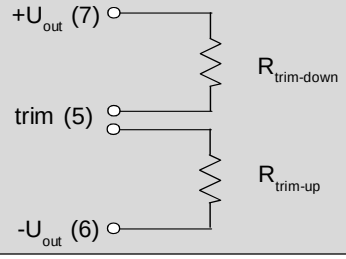
Cooling: Ramp down rate during forced cooling is -10°C / sec from 260°C to 150°C.

External output voltage trim

For the OCW 25SC 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 +Uout pin (trim-down).

Connection:

Example trim-up / trim-down function:

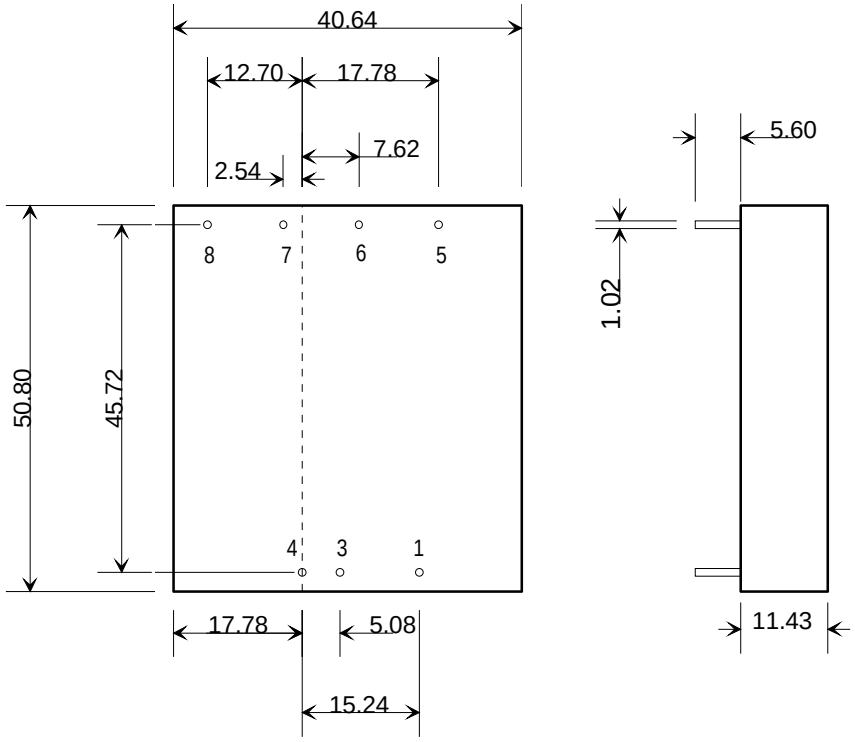


R_{trim} Calculation (where U_{out} is desired output voltage)**:**

$U_{out-nom}$	$R_{trim-up}$	$R_{trim-down}$
1.8 Vdc	$R_{trim-up} = \frac{1.24}{(U_{out}-1.8)} - 1.8$ [kOhm]	$R_{trim-down} = \frac{0.56}{(U_{out}-1.8)} - 2.8$ [kOhm]
2.5 Vdc	$R_{trim-up} = \frac{2.877}{(U_{out}-2.5)} - 8.25$ [kOhm]	$R_{trim-down} = \frac{2.923}{(U_{out}-2.5)} - 10.57$ [kOhm]
3.3 Vdc	$R_{trim-up} = \frac{3.168}{(U_{out}-3.3)} - 7.2$ [kOhm]	$R_{trim-down} = \frac{6.18}{(U_{out}-3.3)} - 15$ [kOhm]
5.0 Vdc	$R_{trim-up} = \frac{5.8}{(U_{out}-5)} - 8.2$ [kOhm]	$R_{trim-down} = \frac{5.8}{(U_{out}-5)} - 10.52$ [kOhm]
12.0 Vdc	$R_{trim-up} = \frac{19.656}{(U_{out}-12)} - 13.304$[kOhm]	$R_{trim-down} = \frac{86.45}{(U_{out}-12)} - 60.1$ [kOhm]
15.0 Vdc	$R_{trim-up} = \frac{25.474}{(U_{out}-15)} - 14.76$ [kOhm]	$R_{trim-down} = \frac{150}{(U_{out}-15)} - 94$ [kOhm]

Case | Gehäuse | Boîtier

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



Pin	Function
1	on /off
3	- Vin
4	+Vin
5	trim
6	- Vout
7	+Vout
8	no pin

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 differents 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.

FABRIMEX
POWER SUPPLIES

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

Germany:
CAC FABRIMEX GmbH • D-89543 Gerstetten
Tel: 07323/ 950-0 • Fax: 07323/ 95050