SERIES: AE40-UW | **DESCRIPTION:** DC-DC CONVERTER

FEATURES

- 40 watts
- high operating temp -40 to +70°C
- 4,000 Vac isolation
- UL 1741; EN 62109 approved
- board mounted
- input voltage range of 200~1,500 Vdc
- low ripple & noise
- OVP protection
- output short circuit protection

MODEL

MODEL	input voltage range (Vdc)	output voltage (Vdc)	output current min (A)	output current max (A)	output power max (W)	ripple & noise[1] max (mVp-p)	efficiency[2] typ (%)
AE40-UW-S12*	200~1500	12	0	3.33	40	300	76
AE40-UW-S15	200~1500	15	0	2.67	40	300	78
AE40-UW-S24*	200~1500	24	0	1.67	40	300	80

Notes:
1. Measured at nominal input, 20 MHz bandwidth oscilloscope, with 10 µF electrolytic and 1 µF ceramic capacitors on the output.
2. Measured at 800 Vdc input voltage, full load.
3. All specifications are measured at Ta=25°C, humidity < 75%, nominal input voltage, and rated output load unless otherwise specified.
4. * Discontinued model.

PART NUMBER KEY

AE40-UW - SXX

Base Number — Output Voltage

INPUT

parameter	conditions/description	min	typ	max	units
operating input voltage		200		1500	Vdc
under voltage shutdown	shut-down range turn-on range	170 180		185 195	Vdc Vdc
current	at 200 Vdc at 800 Vdc at 1500 Vdc			320 80 42	mA mA mA
inrush current	at 200 Vdc at 800 Vdc at 1500 Vdc		30 80 150		A A A
input fuse	4 A / 1500 Vdc (external)				

OUTPUT

parameter	conditions/description	min	typ	max	units
maximum capacitive load	12 Vdc output model 15 Vdc output model 24 Vdc output model			3,000 1,500 680	µF µF µF
voltage accuracy			±2		%
line regulation	from low line to high line, full load		±1		%
load regulation	from 0% to full load		±1		%
delay time	from Vin = 0 V to 90% of rated ouptut voltage			2	s
switching frequency			65		kHz
temperature coefficient	at full load		±0.02		%/°C

PROTECTIONS

parameter	conditions/description	min	typ	max	units
over voltage protection	12 Vdc, 15 Vdc output models 24 Vdc output model			20 30	Vdc Vdc
over current protection	automatic recovery	120		320	%
short circuit protection	continuous, automatic recovery				

SAFETY AND COMPLIANCE

parameter	conditions/description	min	typ	max	units
isolation voltage	input to output for 1 minute	4,000			Vac
safety approvals	CSA, EN 62109, UL 1741				
conducted emissions	CISPR22/EN55022, class A (external circuit required, see Figure 2)				
radiated emissions	CISPR22/EN55022, class A (external circuit required, see Figure 2)				
ESD	IEC/EN61000-4-2, contact ± 6kV/air ± 8kV, class B				
radiated immunity	IEC/EN61000-4-3, 10V/m, class A				
EFT/burst	IEC/EN61000-4-4, ± 2kV, class B (external circuit required, see Figure 2)				
surge	IEC/EN61000-4-5, line-line ± 1kV, class B (external circuit required, see Figure 2)				
conducted immunity	IEC/EN61000-4-6, 10 Vr.m.s, class A				
magnetic field immunity	IEC/EN61000-4-8, 10 A/m, class A				
MTBF	as per MIL-HDBK-217F, 25°C	300,000			hours
RoHS	yes				

ENVIRONMENTAL

parameter	conditions/description	min	typ	max	units
operating temperature	see derating curves	-40		70	°C
storage temperature		-40		85	°C
storage humidity	non-condensing			95	%
altitude	see derating curves			5000	m

SOLDERABILITY

parameter	conditions/description	min	typ	max	units
hand soldering	for 3~5 seconds	350	360	370	°C
wave soldering	for 5~10 seconds	255	260	265	°C

MECHANICAL

parameter	conditions/description	min	typ	max	units
dimensions	125.00 x 75.00 x 40.00 [4.921 x 2.953 x 1.575 inch]				mm
case material	black flame-retardant heat-proof plastic (UL94V-0)				
weight			410		g

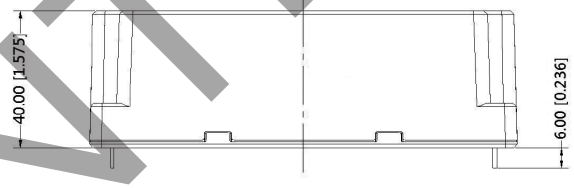
MECHANICAL DRAWING

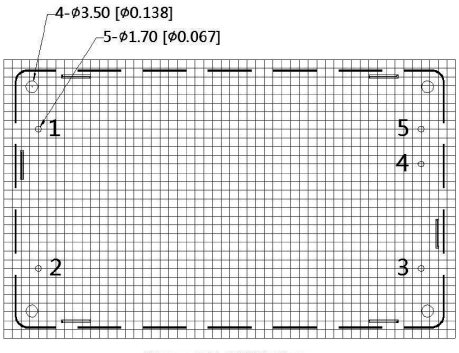
units: mm [inch]
tolerance: ±0.50[±0.020]
pin diameter tolerance: ±0.10[±0.004]
pin height tolerance: ±1.50[±0.059]

In high vibration environments, this series should be mounted with screws.
tightening torque: max 0.4 N*m

PIN CONNECTIONS	
PIN	Function
1	-Vin
2	+Vin
3	NC
4	-Vout
5	+Vout

NC=no connection



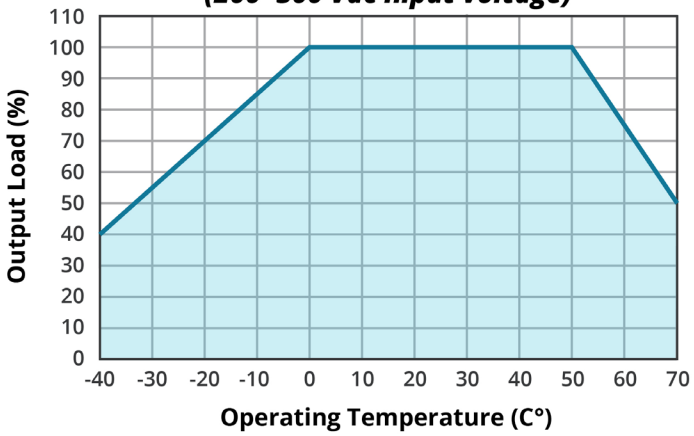


Note : Grid 2.54*2.54mm

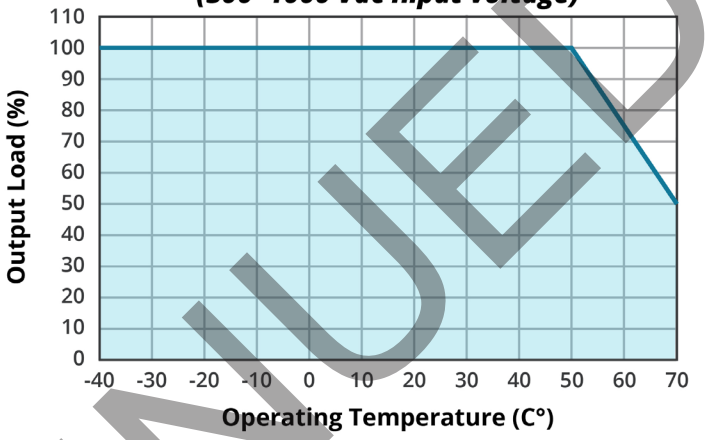
Recommended PCB Layout
Top View

DERATING CURVES

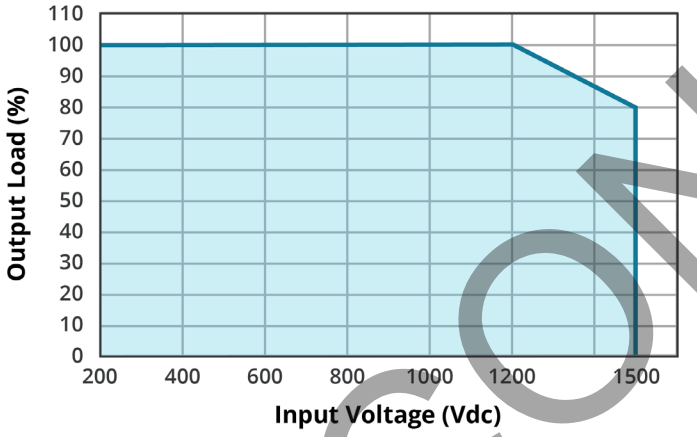
TEMPERATURE DERATING CURVE (200~300 Vdc Input voltage)



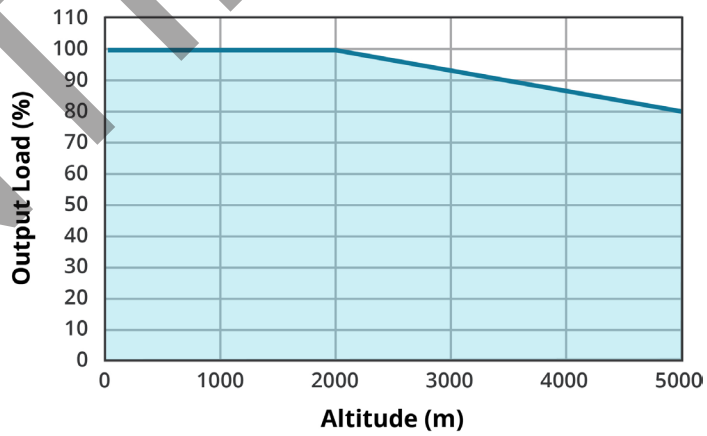
TEMPERATURE DERATING CURVE (300~1000 Vdc Input voltage)



INPUT VOLTAGE DERATING CURVE 25°C

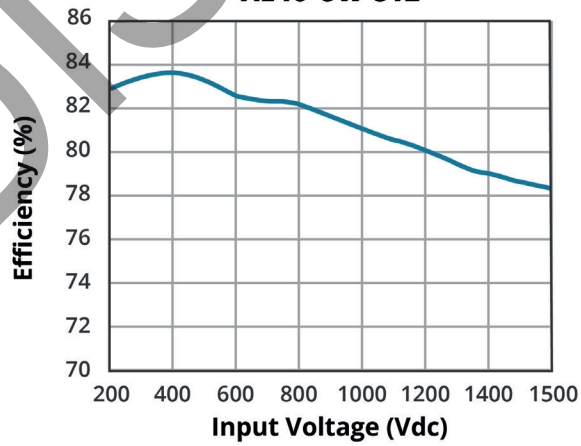


ALTITUDE DERATING CURVE

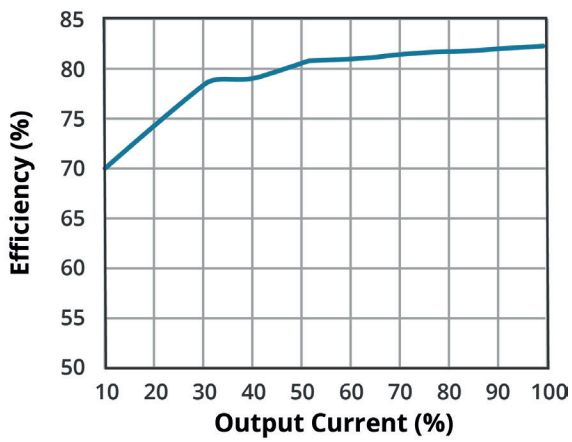


EFFICIENCY CURVES

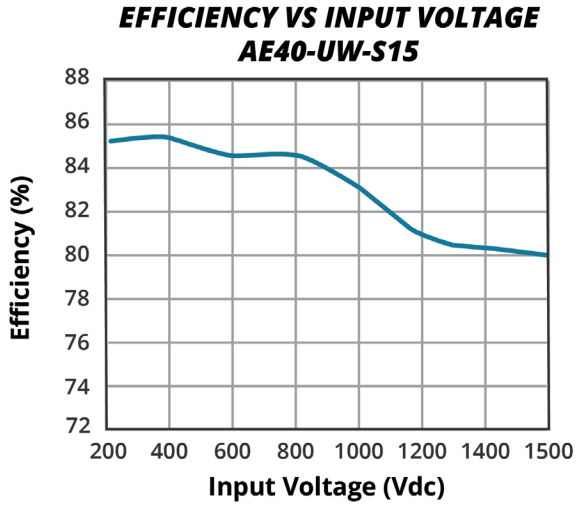
EFFICIENCY VS INPUT VOLTAGE AE40-UW-S12

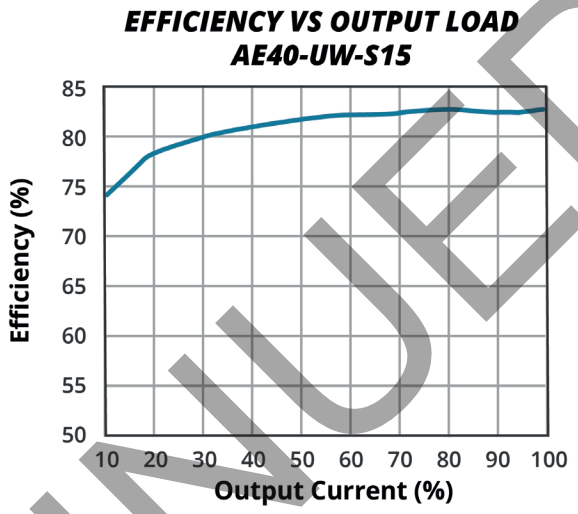


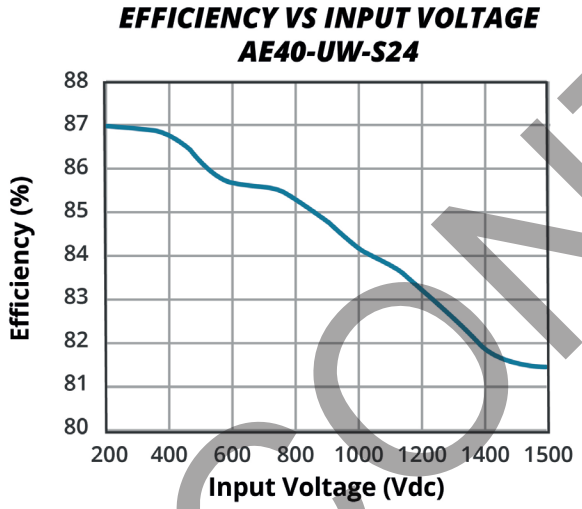
EFFICIENCY VS OUTPUT LOAD AE40-UW-S12

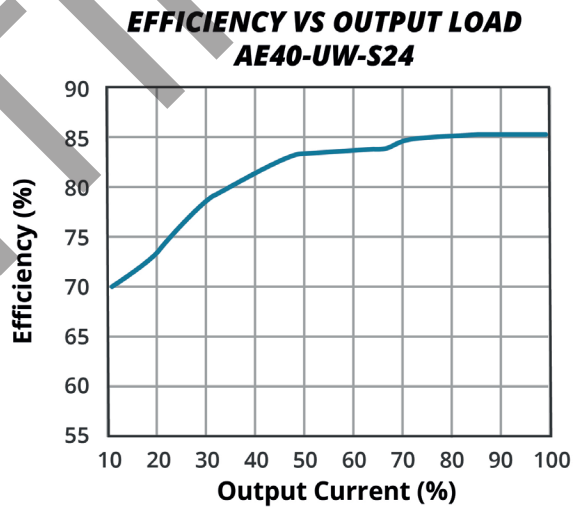


EFFICIENCY CURVES (CONTINUED)









APPLICATION CIRCUIT

Figure 1

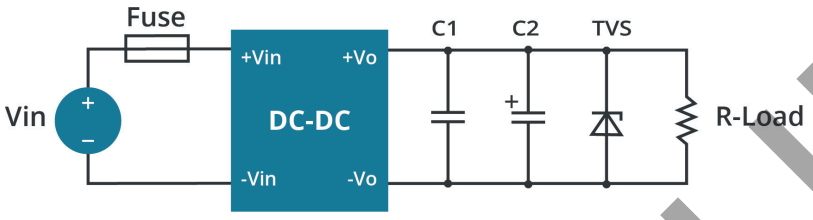


Table 1

Vout (Vdc)	Fuse	C1 (µF)	C2 (µF)	TVS
12	4 A / 1500 Vdc	1	120	SMBJ20A
15	4 A / 1500 Vdc	1	120	SMBJ20A
24	4 A / 1500 Vdc	1	68	SMBJ30A

EMC RECOMMENDED CIRCUIT

Figure 2

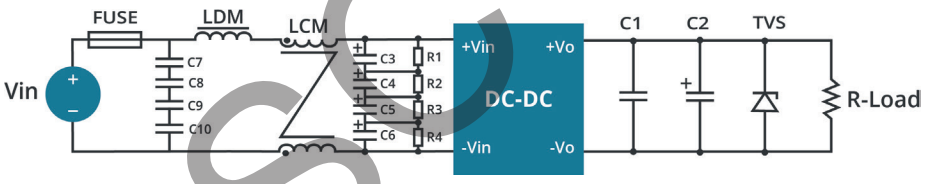


Table 2

Recommended External Circuit Components	
FUSE	4 A/1500 Vdc
C7, C8, C9, C10	104K/275 Vac
C3, C4, C5, C6	47 µF/450 Vdc
R1, R2, R3, R4	1 MΩ/2 W
LDM	330 µH/1 A
LCM	7 mH/1 A

Note: See also Table 1.

Notes:
1. C1 is a ceramic capacitor used to filter high frequency noise.
2. C2 is electrolytic and is recommended to be high frequency and low resistance. For capacitance and current of the capacitor, refer to the datasheet provided by the manufacturer. Capacitance withstand voltage derating should be 80% or above.

REVISION HISTORY

rev.	description	date
1.0	initial release	09/13/2017
1.01	updated datasheet	03/05/2018
1.02	added UL safety approval	02/26/2019
1.03	changed external input fuse recommendation	07/24/2019
1.04	company logo updated	04/12/2021
1.05	derating curves, efficiency curves and circuit figures updated	08/31/2021
1.06	discontinued models AE40-UW-S12 & AE40-UW-S12	11/11/2022

The revision history provided is for informational purposes only and is believed to be accurate.

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