CUI INC
a bel group

SERIES: AE40-EW | DESCRIPTION: DC-DC CONVERTER

FEATURES

- 40 watts
- -25 to +70°C operating temp
- 4,000 Vdc isolation
- extra wide input voltage 6:1
- input voltage from 200~1,200 Vdc
- OVP protection
- output short circuit protection
- board mounted



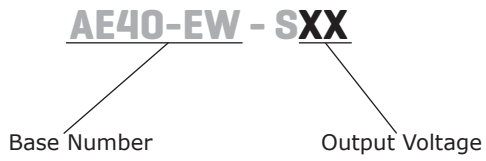
RoHS

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-EW-S12	200~1200	12	0	3.33	40	200	83
AE40-EW-S15	200~1200	15	0	2.67	40	200	84
AE40-EW-S24	200~1200	24	0	1.67	40	200	84

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 200 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.

PART NUMBER KEY



INPUT

parameter	conditions/description	min	typ	max	units
operating input voltage		200		1200	Vdc
under voltage shutdown	shut-down range turn-on range	175 185		185 195	Vdc Vdc
current	at 200 Vdc at 600 Vdc at 1200 Vdc			320 100 55	mA mA mA
inrush current	at 600 Vdc		60		A
input fuse	3.5 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			1,200 1,000 680	µF µF µF
voltage accuracy			±1	±2	%
line regulation	from low line to high line, full load		±0.5	±1	%
load regulation	from 0% to full load		±0.5	±1	%
delay time	from Vin = 0 V to 90% of rated ouptut voltage			1	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	110			%
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			Vdc
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, ± 4kV, class B (external circuit required, see Figure 2)				
surge	IEC/EN61000-4-5, ± 2kV, 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				
voltage dips & interruptions	IEC/EN61000-4-11, 0%-70%, class B				
MTBF	as per MIL-HDBK-217F, 25°C	300,000			hours
RoHS	2011/65/EU				

ENVIRONMENTAL

parameter	conditions/description	min	typ	max	units
operating temperature	see derating curves	-25		70	°C
storage temperature		-25		85	°C
storage humidity	non-condensing			95	%
altitude				2000	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

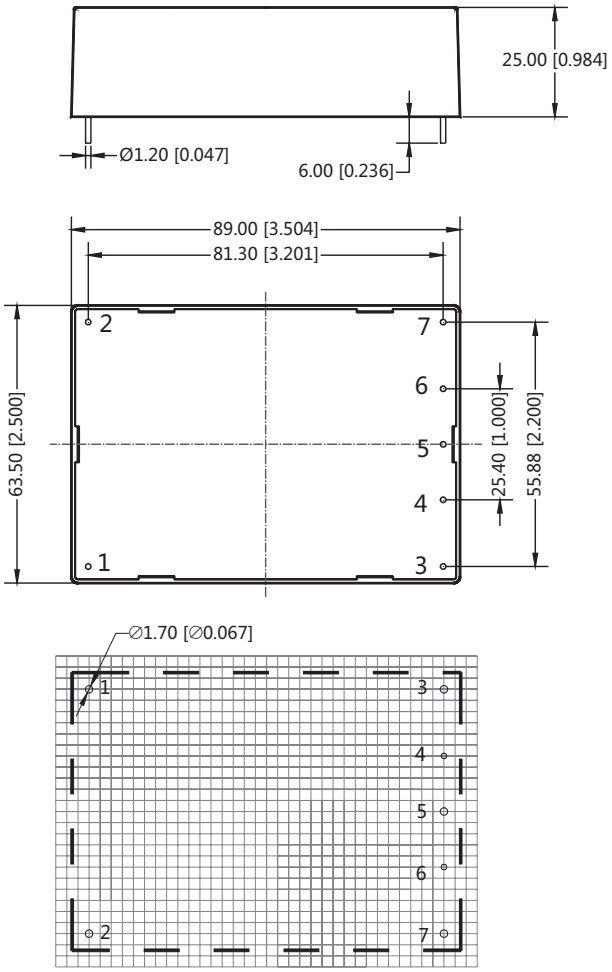
parameter	conditions/description	min	typ	max	units
dimensions	89.00 x 63.50 x 25.00 [3.504 x 2.500 x 0.984 inch]				mm
case material	black flame-retardant heat-proof plastic (UL94V-0)				
weight			210		g

MECHANICAL DRAWING

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

PIN CONNECTIONS	
PIN	Function
1	-Vin
2	+Vin
3	+Vout
4	no pin
5	-Vout
6	no pin
7	NC

NC=no connection

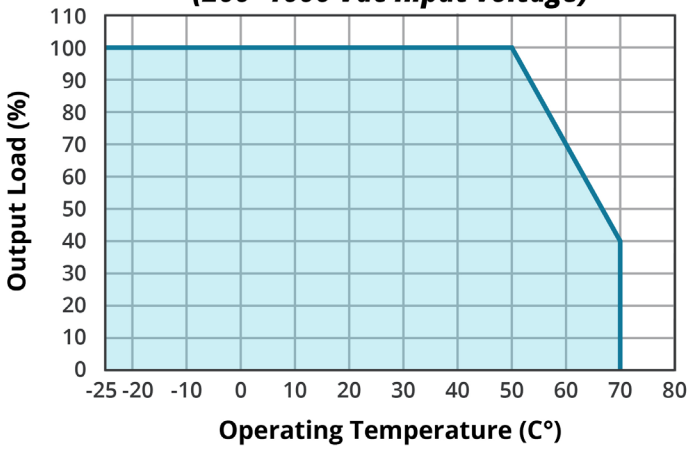


Note : Grid 2.54*2.54mm

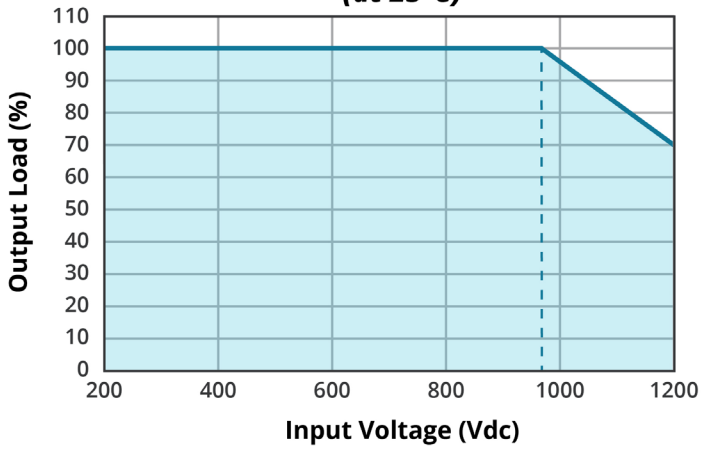
Recommended PCB Layout
Top View

DERATING CURVES

TEMPERATURE DERATING CURVE (200~1000 Vdc Input voltage)

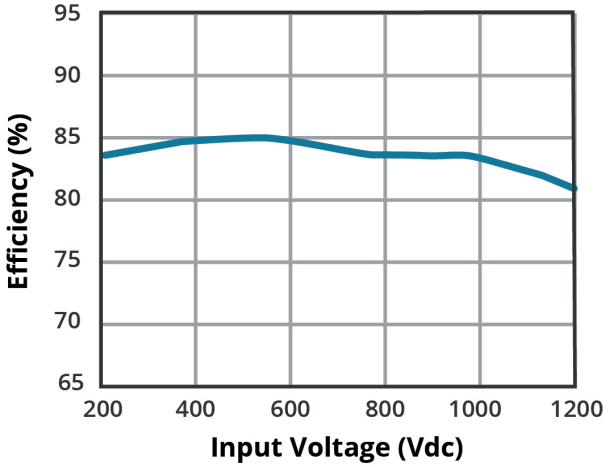


INPUT VOLTAGE DERATING CURVE (at 25°C)

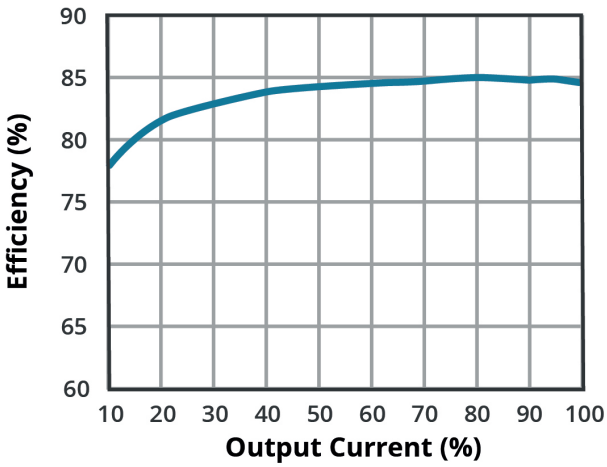


EFFICIENCY CURVES

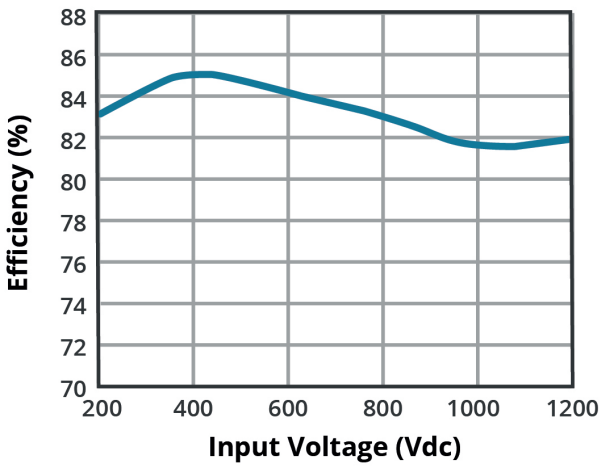
EFFICIENCY VS INPUT VOLTAGE AE40-EW-S12



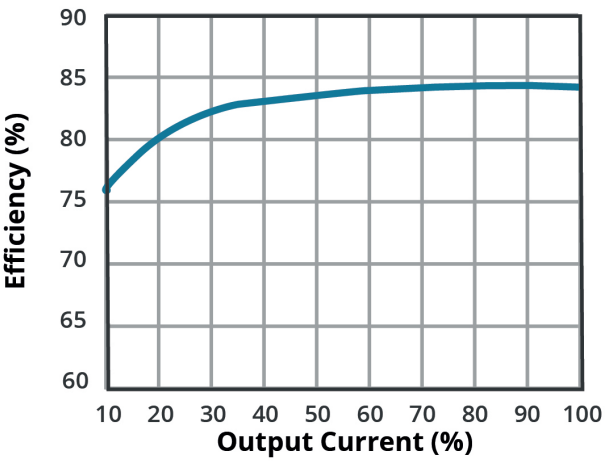
EFFICIENCY VS OUTPUT LOAD AE40-EW-S12



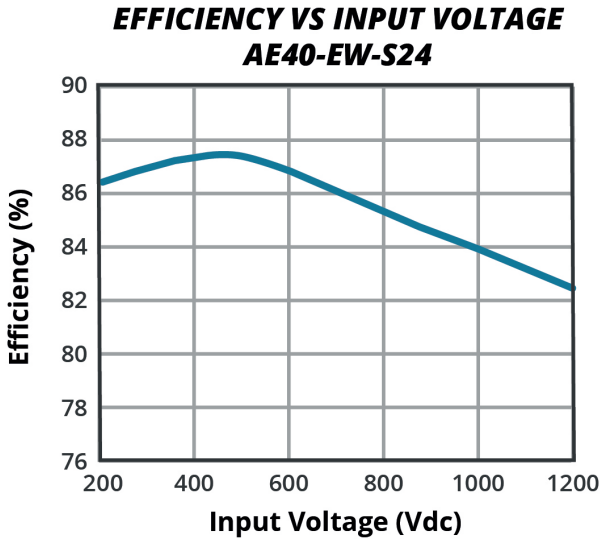
EFFICIENCY VS INPUT VOLTAGE AE40-EW-S15

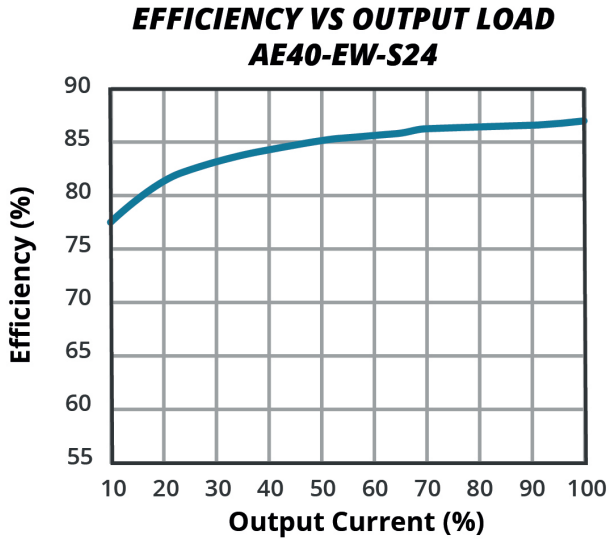


EFFICIENCY VS OUTPUT LOAD AE40-EW-S15



EFFICIENCY CURVES (CONTINUED)





APPLICATION CIRCUIT

Figure 1

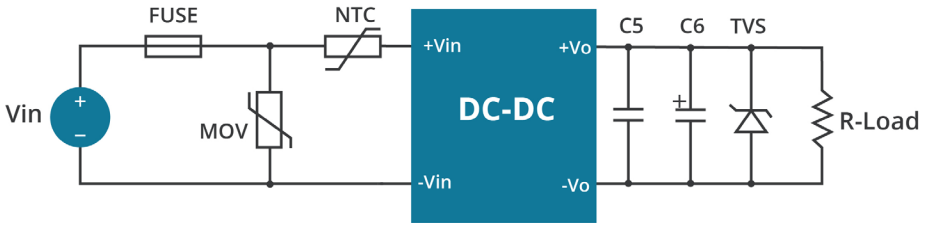


Table 1

Vout (Vdc)	Fuse	MOV	NTC	C5 (µF)	C6 (µF)	TVS
12	3.5 A / 1500 Vdc	S20K1000	10D-20	1	220	SMBJ20A
15	3.5 A / 1500 Vdc	S20K1000	10D-20	1	220	SMBJ20A
24	3.5 A / 1500 Vdc	S20K1000	10D-20	1	120	SMBJ30A

EMC RECOMMENDED CIRCUIT

Figure 2

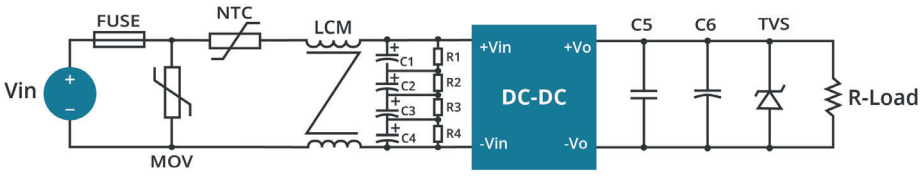


Table 2

Recommended External Circuit Components	
FUSE	3.5 A / 1500 Vdc
MOV	S20K1000
NTC	10D-20
LCM	10 mH
C1, C2, C3, C4	47 µF/450 V
R1, R2, R3, R4	1 MΩ/2 W

Note: See also Table 1.

Notes:
1. C5 is a ceramic capacitor used to filter high frequency noise.
2. C6 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	12/19/2017
1.01	company logo updated	04/12/2021
1.02	derating curves, efficiency curves and circuit figures updated	08/30/2021

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

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CUI offers a two (2) year limited warranty. Complete warranty information is listed on our website.

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