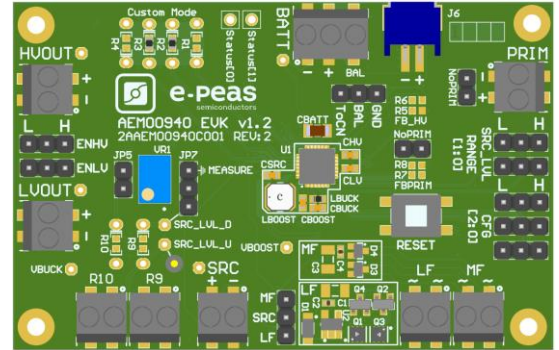


AEM00940

Quick Start Guide EVK



FEATURES

Connectors

- 1 screw connector for the DC source
- 2 screw connectors for AC sources
- 1 screw connector + 1 JST connector for the storage element
- 1 screw connector for primary battery
- 1 screw connector for HVOUT LDO output (80mA @ 1.8 – 4.1 V)
- 1 screw connector for LVOUT LDO output (20mA @ 1.2 or 1.8 V)

Configuration

- 2 headers for SRC_LVL_RANGE[1:0] to define the input voltage regulation of the AEM
- 2 resistors or 1 potentiometer to set the source voltage regulation
- 3 headers CFG[2:0] to define the storage element protection levels
- 6 resistor footprints to configure the custom mode (CFG[000])
- 2 headers to enable/disable the internal LDOs
- 2 headers to disable the primary battery feature
- 1 header to set the dual cell supercapacitor BAL feature

Size

- 79mm x 49mm
- 4 x M2.5 mounting holes

SUPPORT PCB

BOM around the AEM00940

Designator	Description	Quantity	Manufacturer	Part Number
U1	AEM0094x	1	e-peas	order at sales@e-peas.com
For AEM00940:				
L _{BOOST}	Power Inductor 10 µH - 0,55 A - LPS4012	1	Coilcraft	LPS4012-103MR
L _{BOOST} (alt.)	Power Inductor 10 µH - 0,84 A - 3015	1	Würth	744 040 321 00
L _{BOOST} (alt.)	Power Inductor 22 µH - 0,65 A - LPS4018	1	Coilcraft	LPS4018-223MR
For AEM00941:				
L _{BOOST}	Power Inductor 150 µH - 0,42 A - LPS5030	1	Coilcraft	LPS5030-154MRC
C _{BOOST}	Ceramic Cap 22 µF, 10 V, 20%, X5R, 0603	1	Murata	GRM188R61A226ME15D
L _{BUCK}	Power Inductor 10 µH - 0,25 A - 0603	1	TDK	MLZ1608M100WT
C _{BUCK}	Ceramic Cap 10 µF, 10 V, 20%, X5R, 0603	1	TDK	C1608X5R1A106M080AC
C _{SRC}	Ceramic Cap 10 µF, 10 V, 20%, X5R, 0603	1	TDK	C1608X5R1A106M080AC
C _{HV}	Ceramic Cap 10 µF, 25 V, 10%, X7S, 0805	1	TDK	C2012X7S1E106K125AE
C _{LV}	Ceramic Cap 10 µF, 10 V, 20%, X5R, 0603	1	TDK	C1608X5R1A106M080AC
C _{BATT}	Ceramic Cap 150 µF, 6.3 V, 20%, X5R, 1206	1	TDK	GRM31CR60J157ME11L

Footprint & Symbol: Available in the [datasheet](#)





STEP 1: AEM00940 configuration



- **Source range:** SRC_LVL_RANGE[1:0]
- **Storage element voltages protection:** CFG[2:0]

Configuration pins		
SRC_LVL_RANGE[1:0]	Gain	V _{SRC_REG} range
LL	x1	V _{SRC_REG} < 1.35 V
LH	x2	1.35 V < V _{SRC_REG} < 2.70 V
HL	x4	2.70 V < V _{SRC_REG} < 4.47 V
HH		

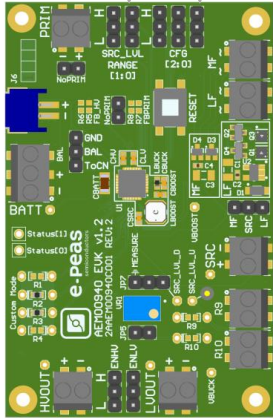
Configuration pins			Storage element threshold voltages			LDOs output voltages		Typical use	
CFG[2]	CFG[1]	CFG[0]	V _{OVCH}	V _{CHRDY}	V _{OVDIS}	V _{HV}	V _{LV}		
H	H	H	4.12 V	3.67 V	3.60 V	3.3 V	1.8 V	Li-ion battery	
H	H	L	4.12 V	4.04 V	3.60 V	3.3 V	1.8 V	Solid state battery	
H	L	H	4.12 V	3.67 V	3.01 V	2.5 V	1.8 V	Li-ion/NiMH battery	
H	L	L	2.70 V	2.30 V	2.20 V	1.8 V	1.2 V	Single-cell (super) capacitor	
L	H	H	4.50 V	3.67 V	2.80 V	2.5 V	1.8 V	Dual-cell supercapacitor	
L	H	L	4.50 V	3.92 V	3.60 V	3.3 V	1.8 V	Dual-cell supercapacitor	
L	L	H	3.63 V	3.10 V	2.80 V	2.5 V	1.8 V	LiFePO4 battery	
L	L	L	Custom mode					1.8 V	

- **BAL option:** Select “ToCn” to use the balancing or “GND” to disable it
- **PRIM option:** Connect both headers “NoPRIM” to disable the primary feature or remove them if a primary battery is connected. Define the lower limit voltage on the primary battery using R7 and R8:

- $RP = R7 + R8$
- $100\text{ k}\Omega \leq RP \leq 500\text{ k}\Omega$
- $R7 = \left(\frac{V_{prim_min}}{4} * RP\right) / 2.2\text{ V}$
- $R8 = RP - R7$

ENLV	ENHV	LV output	HV output
H	H	Enabled	Enabled
H	L	Enabled	Disabled
L	H	Disabled	Enabled
L	L	Disabled	Disabled

- **LDOs outputs voltages:** ENHV (HVOUT) – ENLV (LVOUT)
- **Source level:** Use the potentiometer or resistors R9 and R10 in combination of the source range functionality to define the harvesting voltage.
 - $RS = R9 + R10$
 - $100\text{ k}\Omega \leq RS \leq 500\text{ k}\Omega$
 - $R9 = \left(\frac{V_{src_reg}}{GAIN} * RS\right) / 2.2\text{ V}$
 - $R10 = RS - R9$



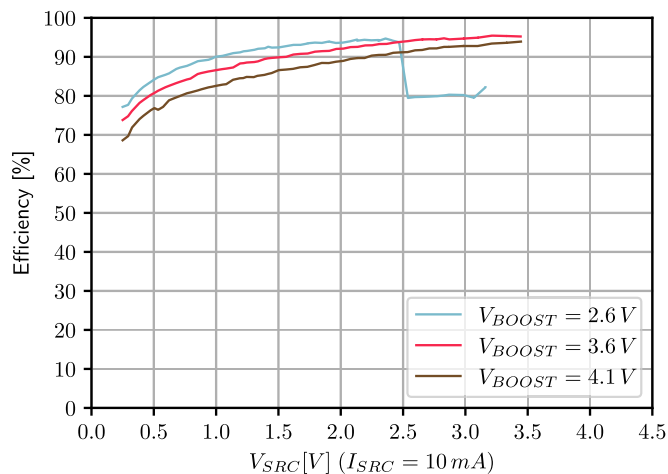
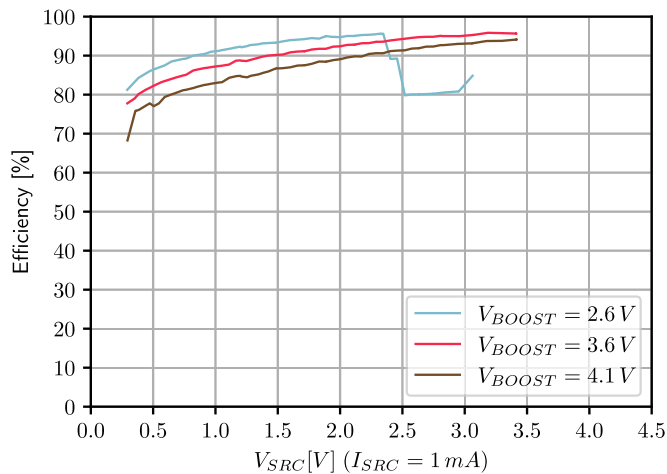
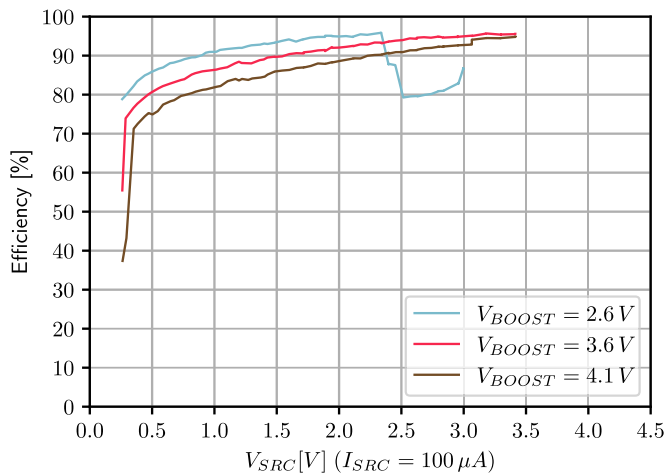


STEP 2: Connect the storage element (and the primary battery)

STEP 3: Connect the Load(s) to HVOUT / LVOUT

STEP 4: Connect the Harvester

Internal Boost efficiency Vs. input voltage 22μH LBOOST:



STEP 5: Check the Status

Status signals			
STATUS[1]	Logic output. Asserted if the battery voltage falls under Vovdis or if the AEM is taking energy from the primary battery.		
STATUS[0]	Logic output. Asserted when the LDOs can be enabled.		

