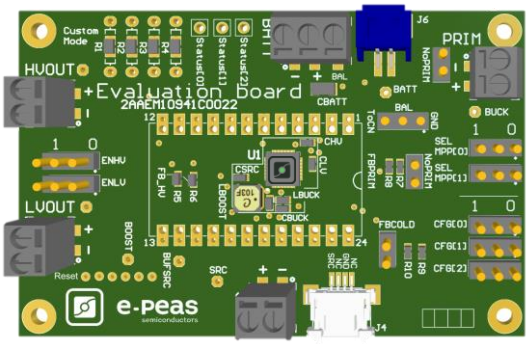
AEM10941
Quick Start Guide EVK



FEATURES

Connectors

- 1 screw connector + 1 connector FFC/FPC for the Photovoltaic Cell
- 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 – 4.2 V)
- 1 screw connector for LVOUT LDO output (20mA @ 1.2 or 1.8 V)

Configuration

- 2 jumpers SELMMP[x] to define the MPPT ratio linked to the harvester technology
- 3 Jumpers CFG[x] to define the storage element protection levels
- 6 resistors footprint related to the custom mode (CFG[2:0]=000)
- 2 jumpers to enable/disable the internal LDOs
- 2 jumpers to define the primary battery minimum level
- 1 jumper to set the dual cell supercapacitor BAL feature
- 1 jumper to set the FB_Cold level (higher coldstart voltage)

Size

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

SUPPORT PCB

BOM around the AEM10941

Designator	Description	Quantity	Manufacturer	Part Number
CBOOST	Ceramic Cap 22 µF, 10 V, 20%, X5R 0603	1	Murata	GRM188R61A226ME15D
CBUCK	Ceramic Cap 10 µF, 10 V, 20%, X5R	1	TDK	C1608X5R1A106M080AC
CHV	Ceramic Cap 10 µF, 10 V, 20%, X5R	1	TDK	C1608X5R1A106M080AC
CLV	Ceramic Cap 10 µF, 10 V, 20%, X5R	1	TDK	C1608X5R1A106M080AC
CSRC	Ceramic Cap 47 µF, 6,3 V, 20%, X5R	1	Murata	GRM188R60J476ME15D
LBOOST	Power Inductor 10 µH - 0,54 A - LPS4012	1	Coilcraft	LPS4012-103MR
	Power Inductor 10 µH - 0,8 A - 3015	1	Würth	744 040 321 00
LBUCK	Power Inductor 10 µH - 0,25 A	1	TDK	MLZ1608M100WT
U1	AEM10941 - Symbol QFN28	1		order at sales@e-peas.com or Where to buy

Footprint & Symbol: Available on the web product page

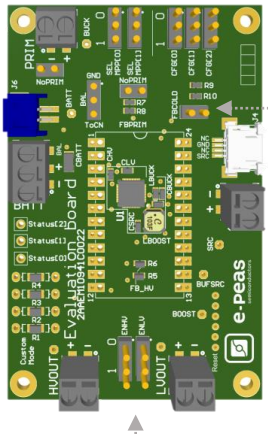
STEP 1: AEM10941 Configuration

SELMPP[1]	SELMPP[0]	Vmpp/Voc
0	0	70 %
0	1	75 %
1	0	85 %
1	1	90 %

- **MPPT ratio:** SELMPP[0] – SELMPP[1]

- **Storage Element voltages protection:** CFG[2] – CFG[1] – CFG[0]

Configuration pins			Storage element threshold voltages			LDOs output voltages		Typical use
CFG[2]	CFG[1]	CFG[0]	Vovch	Vchrdy	Vovdis	Vhv	Vlv	
1	1	1	4.12 V	3.67 V	3.60 V	3.3 V	1.8 V	Li-ion battery
1	1	0	4.12 V	4.04 V	3.60 V	3.3 V	1.8 V	Solid state battery
1	0	1	4.12 V	3.67 V	3.01 V	2.5 V	1.8 V	Li-ion/NiMH battery
1	0	0	2.70 V	2.30 V	2.20 V	1.8 V	1.2 V	Single-cell supercapacitor
0	1	1	4.50 V	3.67 V	2.80 V	2.5 V	1.8 V	Dual-cell supercapacitor
0	1	0	4.50 V	3.92 V	3.60 V	3.3 V	1.8 V	Dual-cell supercapacitor
0	0	1	3.63 V	3.10 V	2.80 V	2.5 V	1.8 V	LiFePO4 battery
0	0	0	Custom mode - Programmable through R1 to R6				1.8 V	



- **BAL option:** Select “ToCn” for dual-cells supercapcacitor and “GND” for any other storage

- **PRIM option:** Connect both jumpers “NoPRIM” or remove them if a primary battery is connected. Define the lower limit voltage on the primary battery using R7 and R8:
  - 100 kΩ ≤ RP ≤ 500 kΩ
  - R7 = $(\frac{Vprim\_min}{4}$ * RP) / 2.2 V
  - R9 = RP – R7

ENLV	ENHV	LV output	HV output
1	1	Enabled	Enabled
1	0	Enabled	Disabled
0	1	Disabled	Enabled
0	0	Disabled	Disabled

- **LDOs Outputs Voltages:** ENHV (HVOUT) – ENLV (LVOUT)

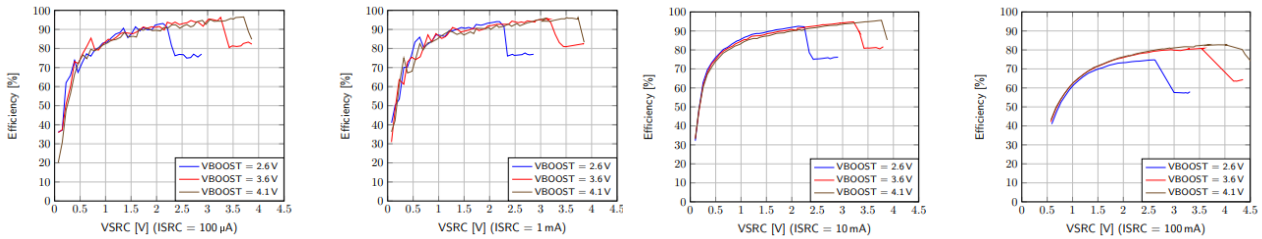
- **FBCOLD option:**
  - 100 kΩ ≤ RC ≤ 10 MΩ
  - R7 = $\frac{0.38\,V}{Vcs}$ * RC
  - R10 = RP – R9

STEP 2: Connect the Storage Element (and the Primary Battery)

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

STEP 4: Connect the Photovoltaic Cell

- **Internal Boost efficiency Vs. input voltage:**



STEP 5: Check the Status

Status pins		
STATUS[2]	19	Logic output. Asserted when the AEM performs a MPP evaluation.
STATUS[1]	20	Logic output. Asserted if the battery voltage falls below Vovdis or if the AEM is taking energy from the primary battery.
STATUS[0]	21	Logic output. Asserted when the LDOs can be enabled.