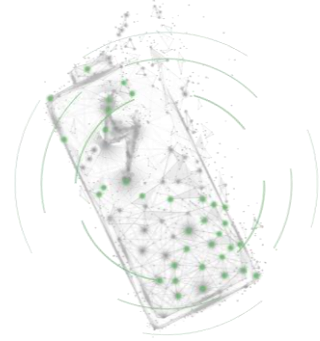




AEM20941

Quick Start Guide EVK



FEATURES

Connectors

- 1 screw connector for the thermo-electric generator (SRC)
- 1 screw connector for the storage element (BATT)
- 1 screw connector for the primary battery (PRIM)
- 1 screw connector for the HVOUT LDO output (80mA @ 1.8 – 3.3 V)
- 1 screw connector for the LVOUT LDO output (20mA @ 1.2 or 1.8 V)
- 1 screw connector for the ZMPP feature (constant impedance)

Configuration

- 2 headers SELMPP[1:0] to configure the MPPT ratio linked to the harvester technology
- 3 headers CFG[2:0] to configure the storage element protection thresholds
- 2 headers to enable/disable the internal LDOs
- 2 headers to disable the primary battery feature
- 1 headers to set the dual-cell supercapacitor balancing feature
- 1 resistors footprint to use the ZMPP feature (constant impedance)
- 5 resistors to connect/disconnect the Ultra-Low Voltage Cold Start circuit.

Reset

- 7 RESET pads (short each pad to GND from left to right to reset the AEM20941)

Size

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

SUPPORT PCB

BOM around the AEM20941

Designator	Description	Quantity	Manufacturer	Part Number
U1	AEM20941 QFN28	1	e-peas	Order at sales@e-peas.com
L _{BOOST}	Power inductor 10 µH, 0.9 A, LPS4018	1	Coilcraft	LPS4018-103MRB
L _{BUCK}	Power inductor 10 µH, 0.25 A, 0603	1	TDK	MLZ1608N100LT
C _{SRC}	Ceramic cap 22 µF, 10 V, 20%, X5R, 0603	1	Murata	GRM188R61A226ME15D
C _{BUCK}	Ceramic cap 10 µF, 10 V, 20%, X5R, 0603	1	TDK	C1608X5R1A106M080AC
C _{HV}	Ceramic cap 10 µF, 10 V, 20%, X5R, 0603	1	TDK	C1608X5R1A106M080AC
C _{LV}	Ceramic cap 10 µF, 10 V, 20%, X5R, 0603	1	TDK	C1608X5R1A106M080AC
C _{BOOST}	Ceramic cap 22 µF, 10 V, 20%, X5R, 0603	1	Murata	GRM188R61A226ME15D
C _{BATT}	Ceramic cap 220 µF, 6.3 V, 20%, X5R, 1206	1	Murata	GRM31CR60J227ME11L
L _{CS}	Coupled inductor 25 µH, 1:20, LPR6532	1	Coilcraft	LPR6235-253PMRB
C _{LIN}	Ceramic cap 2.2 µF, 35 V, 10%, X5R, 0603	1	Murata	GRM188R6YA225KA12D
C _{OUT}	Ceramic cap 220 nF, 10 V, 10%, X5R, 0402	1	Yageo	CC0402KRX5R6BB224
D _{CS}	Schottky diode, 30 V, 200 mA, SOD-323	1	Infineon	BAT5403WE6327HTSA1

Footprint & Symbol: Information available in the datasheet.





STEP 1: Configure the AEM20941

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

SELMPP[1]	SELMPP[0]	Vmpp/Voc
L	L	50%
L	H	55%
H	L	75%
H	H	ZMPP

- **Storage element voltage thresholds:** CFG[2:0]

Configurations 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 supercapacitor
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	Reserved for future use.					

- **BAL feature:** Place a jumper connecting “BAL” to “ToCn” to use the balancing feature or to “GND” to disable it.

- **STONBATT feature:** Place a jumper connecting STONBATT to “H” to enable cold start from the storage element or to “L” to disable it.

- **PRIM feature:** Place a jumper on both “NoPRIM” headers to disable the primary battery feature or remove them if a primary battery is connected. Define the primary battery overdischarge voltage through R7 and R8:

- $RP = R7 + R8$
- $100\text{ k}\Omega \leq RP \leq 500\text{ k}\Omega$
- $R7 = \frac{V_{PRIM,MIN} \cdot RP}{2.2\text{ V}}$
- $R8 = RP - R7$

- **LDO outputs voltages:** ENLV (LVOUT) – ENHV (HVOUT)

ENLV	LVOUT	ENHV	HVOUT
L	Disabled	L	Disabled
H	Enabled	H	Enabled

- **ULVCS circuit:** To disconnect the ULVCS circuit, disconnect R1, R2, R3, and R4, and connect R5 (PCB bottom). To connect the ULVCS circuit, connect R1, R2, R3, and R4, and disconnect R5 (PCB bottom).



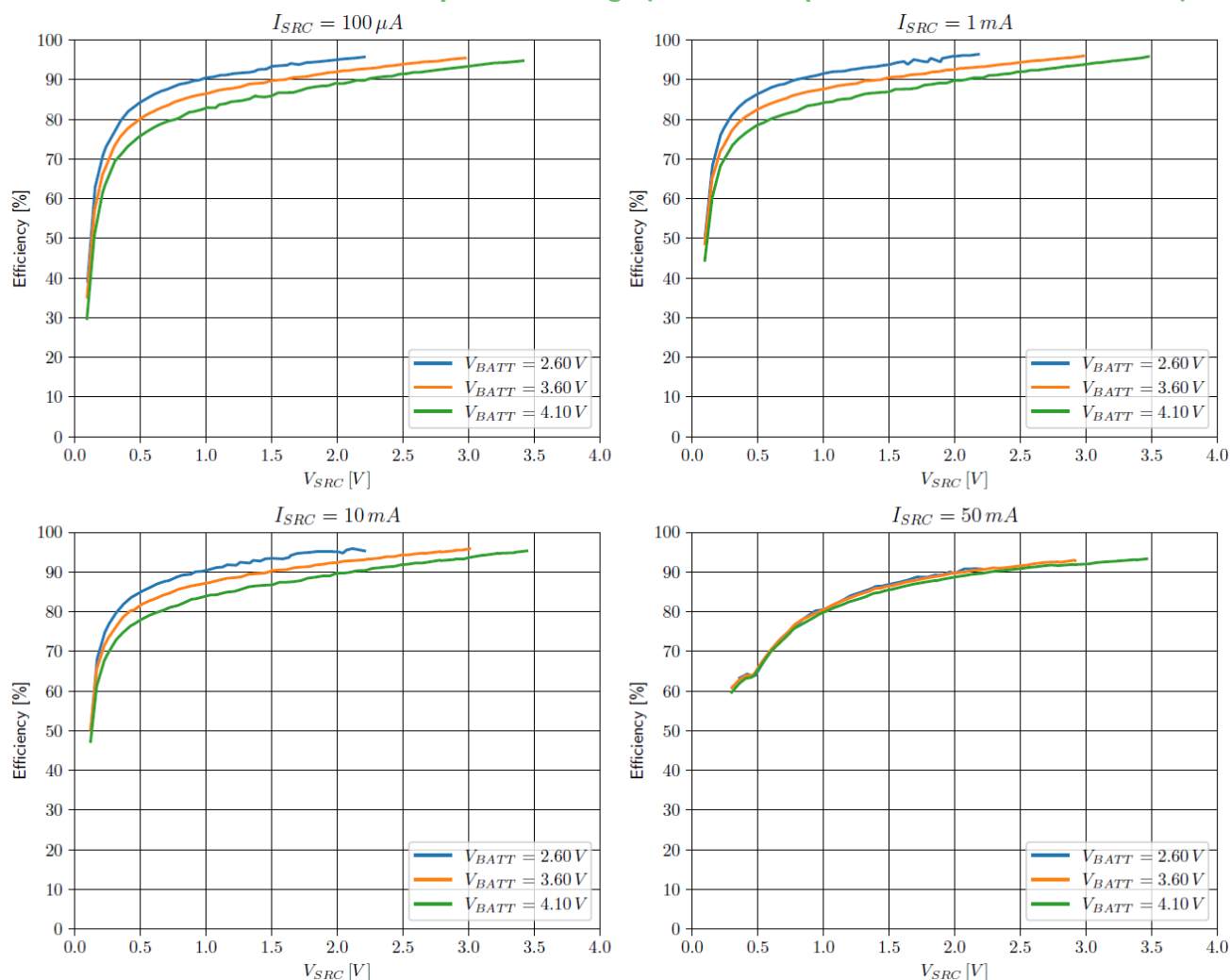


STEP 2: Connect the storage element (and the primary battery)

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

STEP 4: Connect the harvester to SRC

Internal boost efficiency vs SRC voltage (LBOOST: 10 μ H Coilcraft LPS4018-103MRB):



STEP 5: Check the status

Status signals	Description
STATUS[1]	Logic output. Asserted if the battery voltage falls under Vovdis or if the AEM20941 is taking energy from the primary battery.
STATUS[0]	Logic output. Asserted when the LDOs can be enabled.

