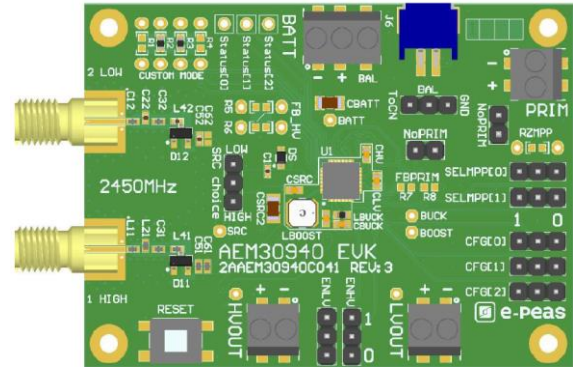


# AEM30940 RF 2.45 GHz Quick Start Guide EVK



## FEATURES

### Connectors

- 1 SMA connector for input power below -10dBm [LOW]
- 1 SMA connector for input power above -10dBm [HIGH]
- 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 SELMMP[1:0] to define the MPPT ratio linked to the harvester technology
- 3 headers CFG[2:0] to define the storage element protection levels
- 6 resistors footprint related to the custom mode (CFG[000])
- 2 headers to enable/disable the internal LDOs
- 2 headers to define the primary battery minimum level
- 1 header to set the dual cell supercapacitor BAL feature
- 1 resistors footprint to use the ZMPP feature (constant impedance)

### Size

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

## SUPPORT PCB

### BOM around the AEM30940

Designator	Description	Quantity	Manufacturer	Part Number
U1	AEM30940	1	e-peas	order at sales@e-peas.com
L <sub>BOOST</sub>	Power Inductor 10 µH - 0,54 A - LPS4012	1	Coilcraft	LPS4012-103MR
L <sub>BOOST</sub> (alt.)	Power Inductor 10 µH - 0,8 A - 3015	1	Würth	744 040 321 00
L <sub>BOOST</sub> (alt.)	Power Inductor 22 µH - 0,65 A - LPS4018	1	Coilcraft	LPS4018-223MR
C <sub>BOOST</sub>	Ceramic Cap 22 µF, 10 V, 20%, X5R, 0603	1	Murata	GRM188R61A226ME15D
L <sub>BUCK</sub>	Power Inductor 10 µH - 0,25 A - 0603	1	TDK	MLZ1608M100WT
C <sub>BUCK</sub>	Ceramic Cap 10 µF, 10 V, 20%, X5R, 0603	1	TDK	C1608X5R1A106M080AC
C <sub>SRC</sub>	Ceramic Cap 10 µF, 10 V, 20%, X5R, 0603	1	TDK	C1608X5R1A106M080AC
C <sub>HV</sub>	Ceramic Cap 10 µF, 25 V, 10%, X7S, 0805	1	TDK	C2012X7S1E106K125AE
C <sub>LV</sub>	Ceramic Cap 10 µF, 10 V, 20%, X5R, 0603	1	TDK	C1608X5R1A106M080AC
C <sub>BATT</sub>	Ceramic Cap 150 µF, 6.3 V, 20%, X5R, 0603	1	TDK	GRM31CR60J157ME11L

Matching network and RF rectifier schematic under NDA signature

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





## STEP 1: AEM30940 Configuration



SELMPP[1]	SELMPP[0]	Vmpp/Voc
L	L	50%
L	H	65%
H	L	80%
H	H	ZMPP

- **MPPT ratio:** SELMPP[1:0]
- **Storage Element voltages protection:** CFG[2:0]

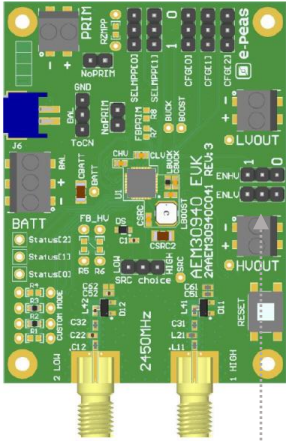
Configuration pins			Storage element threshold voltages			LDOs output voltages		Typical use	
CFG[2]	CFG[1]	CFG[0]	V <sub>OVCH</sub>	V <sub>CHRDY</sub>	V <sub>OVDIS</sub>	V <sub>HV</sub>	V <sub>LV</sub>		
H	H	H	4.12 V	3.67 V	3.60 V	3.3 V	1.8 V	Li-ion battery	
H	H	L	4.12 V	4.04 V	3.60 V	3.3 V	1.8 V	Solid 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 battery feature or remove them if a primary battery is connected. Define the lower limit voltage on the primary battery using R7 and R8:

- $RP = R7 + R9$
- $100\text{ k}\Omega \leq RP \leq 500\text{ k}\Omega$
- $R7 = \left( \frac{V_{prim\_min}}{4} * RP \right) / 2.2\text{ V}$
- $R8 = RP - R7$

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

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



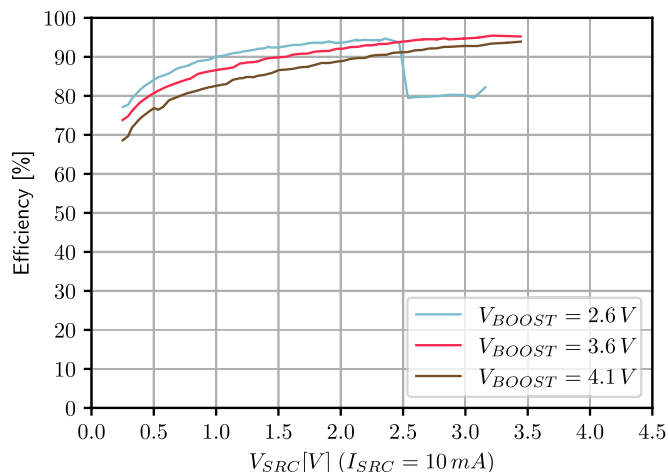
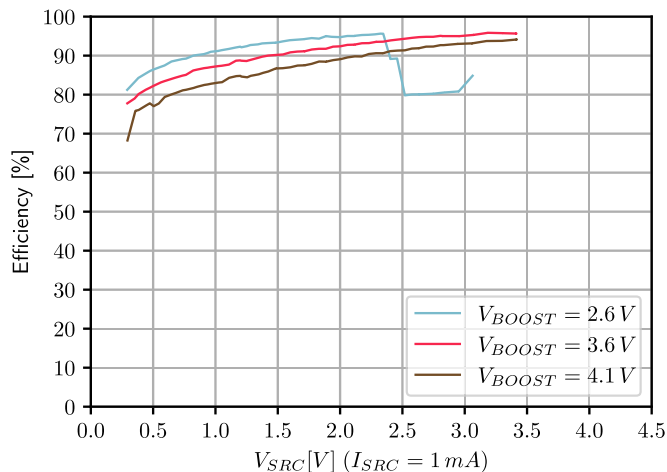
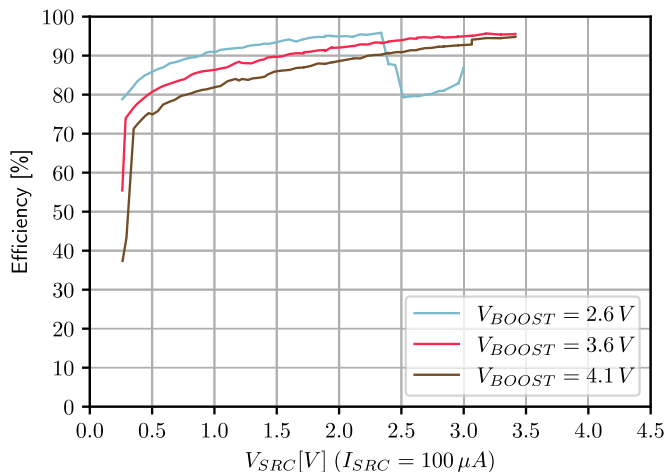


**STEP 2:** Connect the storage element (and the primary battery)

**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[2]	Logic output. Asserted when the AEM performs a MPP evaluation.		
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.		



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