AEM30940 RF 868 MHz 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 – 4.2 V)
- 1 screw connector for LVOUT LDO output (20mA @ 1.2 or 1.8 V)

Configuration
- 2 jumpers SELMP[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 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

Matching network and RF rectifier schematic under NDA signature

Footprint & Symbol: Available on the web product page
**STEP 1: AEM30940 Configuration**

- **MPPT ratio**: SELMPP0 – SELMPP1

<table>
<thead>
<tr>
<th>SELMPP[0]</th>
<th>SELMPP[1]</th>
<th>Vmpp/Voc</th>
</tr>
</thead>
<tbody>
<tr>
<td>0, 0</td>
<td>50 %</td>
<td></td>
</tr>
<tr>
<td>0, 1</td>
<td>65 %</td>
<td></td>
</tr>
<tr>
<td>1, 0</td>
<td>80 %</td>
<td></td>
</tr>
<tr>
<td>1, 1</td>
<td>ZMPP</td>
<td></td>
</tr>
</tbody>
</table>

- **Storage Element voltages protection**: CFG2 – CFG1 – CFG0

- **BAL option**: Select “ToCn” for dual-cells supercapacitor 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 (2.2V by default with the jumper and OR R7 mounted)
  
  - $100 \, \text{k}\Omega \leq RP \leq 500 \, \text{k}\Omega$
  - $R7 = \left( \frac{V_{prim\_min}}{4} \right) \times RP / 2.2 \, \text{V}$
  - $R9 = RP - R7$

- **ZMPP resistor footprint**

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

- **MATCHING NETWORK + RF RECTIFIER**: one matching for LOW input power (< -10 dBm) and another matching for HIGH input power (< +20 dBm)

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

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

**STEP 4: Connect the antenna to the SMA connector**

- **Overall efficiency from the antenna to the storage element:**

**STEP 5: Check the Status**

<table>
<thead>
<tr>
<th>Status pins</th>
<th>19</th>
<th>Logic output. Asserted when the AEM performs a MPP evaluation.</th>
</tr>
</thead>
<tbody>
<tr>
<td>STATUS[0]</td>
<td>20</td>
<td>Logic output. Asserted if the battery voltage falls below Vmin or if the AEM is taking energy from the primary battery.</td>
</tr>
<tr>
<td>STATUS[1]</td>
<td>21</td>
<td>Logic output. Asserted when the LDOs can be enabled.</td>
</tr>
</tbody>
</table>