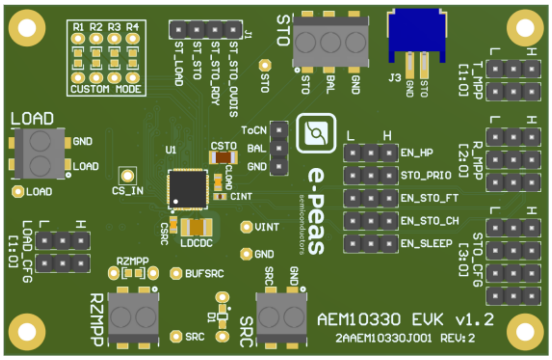
AEM10330
Quick Start Guide EVK



FEATURES

Connectors

- 1 screw connector for the source.
- 1 screw connector + 1 JST connector for the storage element.
- 1 screw connector for the application circuit.
- 1 screw connector for RZMPP.

Configuration

- 3 headers R_MPP[2:0] to configure the source MPP ratio.
- 2 headers T_MPP[1:0] to configure the source MPP timings.
- 4 headers STO_CFG[3:0] to configure the storage element protection levels.
- 4 resistor footprints, R1 to R4, related to the custom mode (STO_CFG[3:0]=LHHH).
- 2 headers LOAD_CFG[1:0] to configure the LOAD voltage.
- 1 header to set the dual-cell supercapacitor BAL feature.
- 5 headers to configure the different modes.

Size

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

SUPPORT PCB

BOM around the AEM10330

Designator	Description	Quantity	Manufacturer	Part Number
U1	AEM10330 - Symbol QFN 40-pin	1	e-peas	order at sales@e-peas.com
L_{DCDC}	Power inductor 10 µH - 1.76A	1	Murata	DFE252010F-100M
C_{INT}	Ceramic Cap 10 µF, 6.3V, 20%, X5R 0402	1	Murata	GRM155R60J106ME15
C_{SRC}	Ceramic Cap 22 µF, 10V, 20%, X5R 0603	1	Murata	GRM188R61A226ME15D
C_{LOAD}	Ceramic Cap 47 µF, 6.3V, 20%, X5R 0603	1	Murata	GRM188R60J476ME15
C_{STO} (optional)	Ceramic Cap 150 µF, 6.3V, 20%, X5R 1206	1	Murata	GRM31CR60J157ME11L

Footprint & Symbol: Information available in the datasheet.

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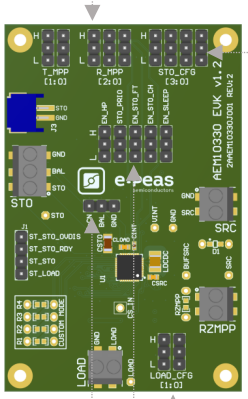
STEP 1: Configure the AEM10330

- **Source voltage regulation:** R_MPP[2:0] and T_MPP[1:0]

Configuration pins			MPPT ratio
R_MPP[2:0]			V_{MPP} / V_{OC}
L	L	L	60%
L	L	H	65%
L	H	L	70%
L	H	H	75%
H	L	L	80%
H	L	H	85%
H	H	L	90%
H	H	H	ZMPP

Configuration pins		MPPT timing	
T_MPP[1:0]		Sampling duration	Sampling period
L	L	5.19 ms	280 ms
L	H	70.8 ms	4.5 s
H	L	280 ms	17.9 s
H	H	1.12 s	71.7 s



- **Storage element voltages protection:** STO_CFG[3:0]

Configuration pins				Storage element threshold voltages			Typical use
STO_CFG[3:0]				V_{OVDIS}	V_{CHRDY}	V_{OVCH}	
L	L	L	L	3.00 V	3.50 V	4.05 V	$LiCoO_2$ battery, Li-Po battery, Lithium Titanate (3.8 V) battery (long life).
L	L	L	H	2.80 V	3.10 V	3.60 V	$LiFePO_4$ battery, Lithium capacitor (LiC).
L	L	H	L	1.85 V	2.40 V	2.70 V	Dual-cell NiMH battery, Lithium-Titanate (2.4V) battery.
L	L	H	H	0.20 V	1.00 V	4.65 V	Dual-cell supercapacitor.
L	H	L	L	0.20 V	1.00 V	2.60 V	Single-cell supercapacitor.
L	H	L	H	1.00 V	1.20 V	2.95 V	Single-cell supercapacitor.
L	H	H	L	1.85 V	2.30 V	2.60 V	Lithium-Titanate battery (2.4V).
L	H	H	H	Custom Mode (single-cell NiMH battery, LiC, etc.)			
H	L	L	L	1.10 V	1.25 V	1.50 V	Ni-Cd single-cell battery.
H	L	L	H	2.20 V	2.50 V	3.00 V	Ni-Cd dual-cell battery.
H	L	H	L	1.45 V	2.00 V	4.65 V	Dual-cell supercapacitor.
H	L	H	H	1.00 V	1.20 V	2.60 V	Single-cell supercapacitor.
H	H	L	L	2.00 V	2.30 V	2.60 V	Solid State battery.
H	H	L	H	3.00 V	3.50 V	4.35 V	$LiCoO_2$ battery, Li-Po battery, Lithium Titanate (3.8 V) battery.
H	H	H	L	2.60 V	2.70 V	4.00 V	Tadiran TLI.
H	H	H	H	2.60 V	3.50 V	3.90 V	Tadiran HLC.

- **LOAD voltage:** LOAD_CFG[1:0]

Configuration pins		LOAD output voltage			
LOAD_CFG[1:0]		$V_{LOAD,MIN}$	$V_{LOAD,MID}$	$V_{LOAD,TYP}$	$V_{LOAD,MAX}$
L	L	3.15 V	3.23 V	3.28 V	3.34 V
L	H	2.35 V	2.47 V	2.50 V	2.53 V
H	L	1.64 V	1.75 V	1.79 V	1.82 V
H	H	1.14 V	1.16 V	1.20 V	1.23 V

- **BAL option:** Select “ToCn” to use the balancing or “GND” to disable it.

- **Configuration mode:** Jumper to H to enable or to L to disable the features:
  - EN_HP: High power mode enabling.
  - STO_PRIO: Storage element charge priority over LOAD at start-up.
  - EN_STO_FT: Source to storage element feed-through enabling.
  - EN_STO_CH: Storage element charge enabling.
  - EN_SLEEP: Sleep state enabling.

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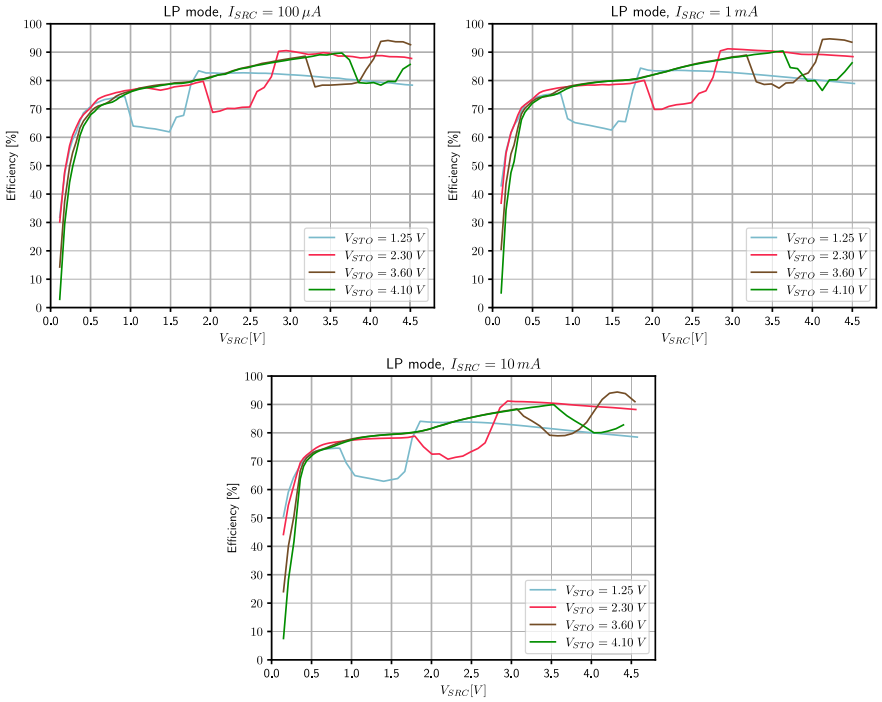
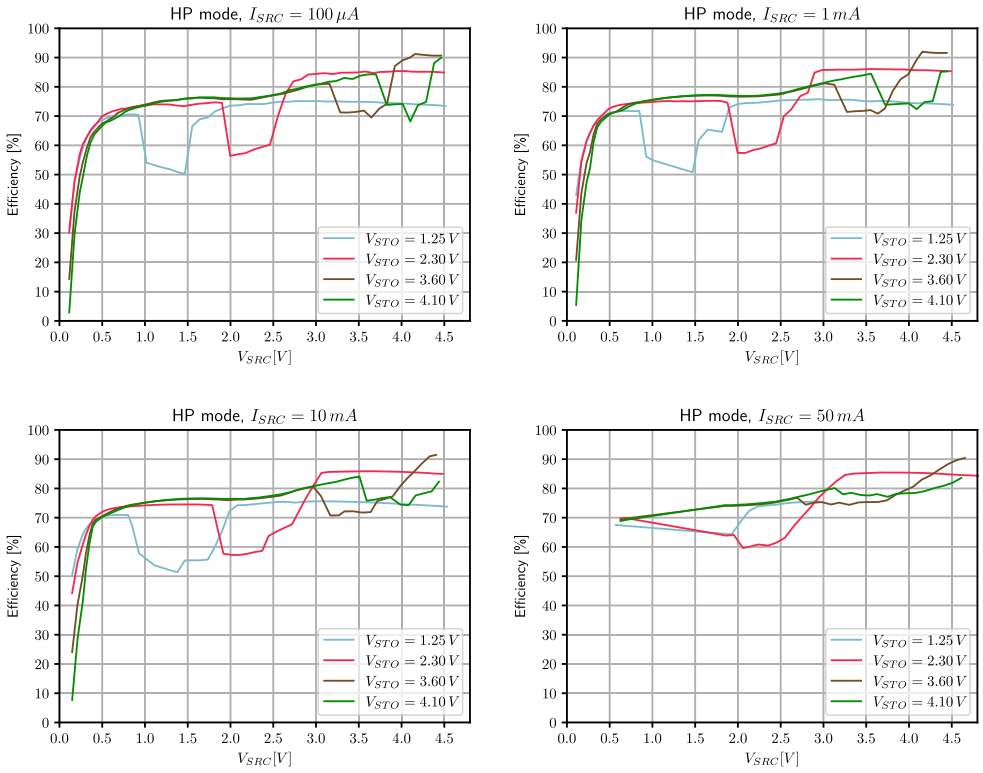
STEP 2: Connect the storage element

STEP 3: Connect the harvester

- **Internal boost efficiency Vs. input voltage in Low Power mode:**



- **Internal boost efficiency Vs. input voltage in High Power mode:**



STEP 4: Check the status

Status Pins				
ST_LOAD	36	Logic Output	HIGH: V_{LOAD}	HIGH when the LOAD voltage V_{LOAD} rises above the $V_{LOAD,TYP}$ threshold. LOW when V_{LOAD} drops below $V_{LOAD,MIN}$ threshold.
ST_STO_RDY	37	Logic Output	HIGH: V_{LOAD}	HIGH when V_{STO} is above V_{CHRDY}. LOW when V_{STO} drops below V_{CHRDY}.
ST_STO_OVDIS	38	Logic Output	HIGH: V_{LOAD}	HIGH when the AEM00330 state is SHUTDOWN STATE. LOW when in any other state.
ST_STO	40	Logic Output	HIGH: V_{STO}	HIGH when the storage device voltage V_{STO} rises above V_{CHRDY} threshold. LOW when V_{STO} drops below the V_{OVDIS} threshold.

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