EN6338QI 3A PowerSoC

Step-Down DC-DC Switching Converter with Integrated Inductor

EVALUATION BOARD OVERVIEW

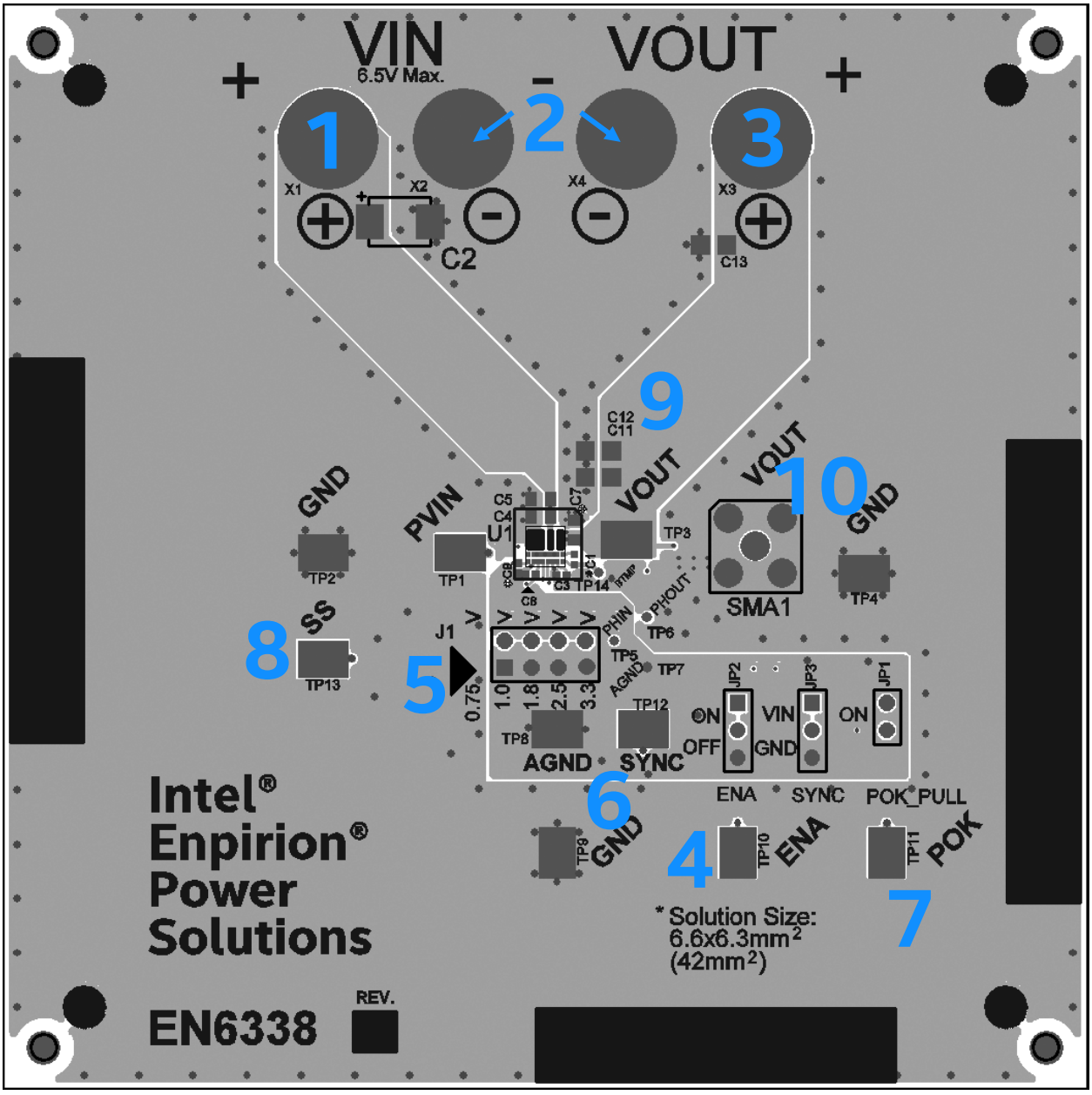


Figure 1: Evaluation Board (EVB) Features (Top View)

NOTE A: The EN6338I Evaluation Board is shown in Figure 1 with the important features numbered.

NOTE B: The following instructions will directly correlate with the numbers shown in Figure 1.

EVALUATION BOARD INSTRUCTIONS

1) Input Supply (VIN) - Connect 2.7V to 6.6V supply on VIN (X1). Pay attention to input polarity and do not turn on until everything is connected correctly.

2) Ground (GND) - Connect the input and output ground to GND (X2, X4).

3) Output Voltage (VOUT) - Connect the load to VOUT (X3). If the instructions were followed up to this point, the device may be powered on.

4) Enable (ENA) – The ENA is used to enable or disable the device. Connecting a jumper on ENA (JP2) towards the OFF side will disable the device. Similarly, connecting a jumper on the ENA (JP2) towards the ON side will enable the device. An external signal may be applied to the ENA (TP10) to enable or disable the device (ON > 1.5V, OFF < 1.2V) .

5) Output Voltage Settings (J1) - The output voltage may be adjusted quickly by placing a jumper one of the selections on J1. The voltages are pre-set by the resistors R11, R10, R9, R8 (on back of board) which corresponds to 3.3V, 2.5V, 1.8V and 1.0V respectively. No jumper will set the voltage to the reference voltage of 0.75V. The compensation C_A (C_A = C10) may be adjusted according to Table 1 for best results. The output voltage may also be adjusted to any voltage as indicated by the equation for R_B shown in Figure 2.

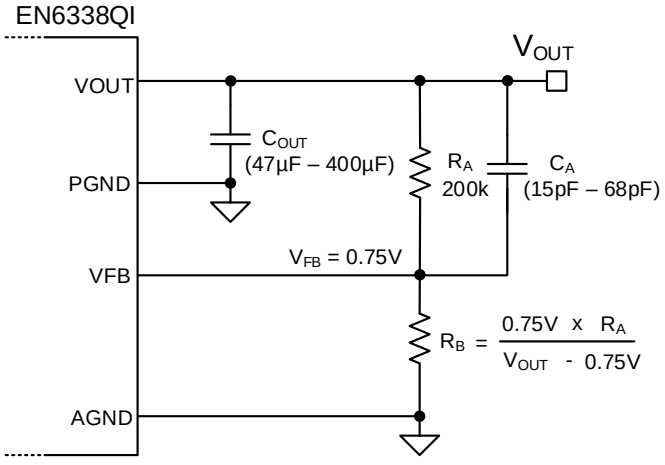


Figure 2: VOUT Resistor Divider & Compensation Capacitor

6) Light Load Mode/Clock Sync (SYNC) – At static Logic HIGH (PVIN), device will allow automatic engagement of light load mode. At static logic LOW (GND), the device is forced into PWM only. A clocked input to this pin will synchronize the internal switching frequency to the external signal. Do not leave this pin floating.

7) Power OK (POK) - This is the open drain Power OK flag. When VOUT is over 90% of regulation, POK will be pulled high to VIN through the R1 resistor (R1 is on the backside of the board).

Table 1: External Compensation Recommendations

V_{IN}	V_{OUT}	R_B	C_A	R_A	C_{OUT} (0805)
2.7V – 6.6V	0.75V	OPEN	27pF	200kΩ	2 x 22µF
	0.9V	1MΩ	27pF		
	1.0V	604kΩ	22pF		
	1.2V	332kΩ	22pF		
	1.5V	200kΩ	18pF		
	1.8V	143kΩ	18pF		
	2.5V	84.5kΩ	15pF		
	3.3V	59kΩ	15pF		

8) Soft Start Capacitor (C_{SS}) – The soft start capacitor is 15nF by default and can be between 10nF to 100nF. The output rise time is controlled by (C_{SS} = C8). The voltage rise time calculation is shown:

Rise Time → t_{RISE} [ms] = C_{ss} [nF] x 0.08

C_{SS} = 15nF → $t_{RISE} \approx$ 1.2ms

C_{SS} = 100nF → $t_{RISE} \approx$ 8ms

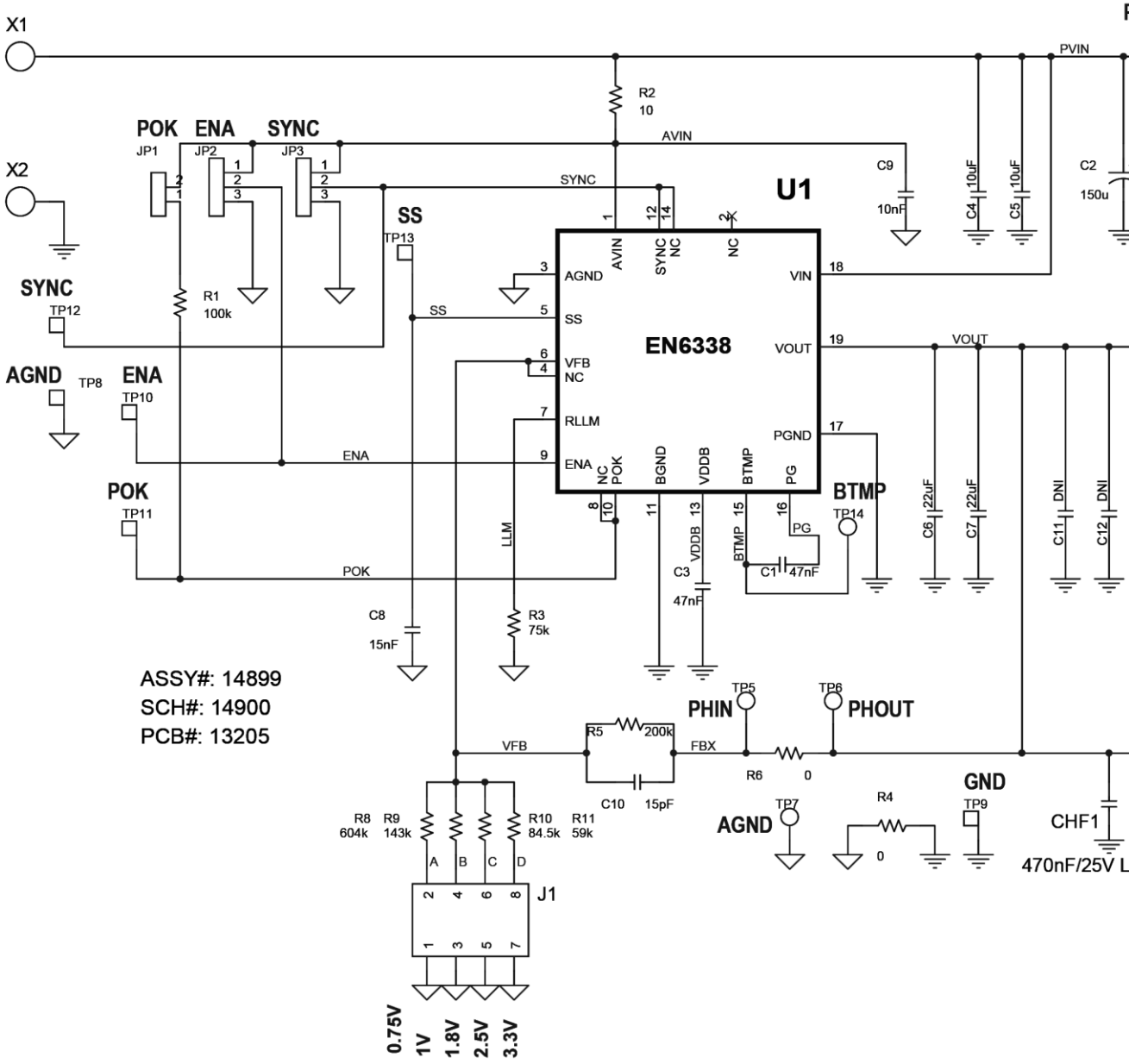
9) Bulk Capacitors – The EN6338QI may support up to 400µF on the output, but the compensation should be adjusted accordingly. Using Table 1 as the reference for C_A, if C_{OUT} is increased, then the C_A (C_A = C10)should also be increased. The relationship is linearly shown below:

$\Delta C_{OUT} \approx$ +100µF → $\Delta C_A \approx$ +10pF

The recommended maximum output capacitance (C_{OUT_MAX}) is 400µF and phase-lead capacitance (C_{A_MAX}) is 68pF.

10) Output Ripple Measurement (SMA1) – A SMA cable may be connected to SMA1 to measure the AC coupled output ripple.

EVALUATION BOARD SCHEMATIC



BILL OF MATERIALS (B.O.M.)

Quantity	Reference	Value	Manufacturer	Part Number	PCB Footprint	Voltage	Tole
1	C8	15nF	Murata	GRM155R71E153KA61D	0402	25V	±1
2	C4,C5	10uF	Murata	GRM21BR71A106KE51L	0805	10V	±1
1	CHF1	470nF	Murata	LLL31MR71E474MA01L	1612	25V	±2
2	C1,C3	47nF	Murata	GRM155R71A473KA01	0402	10V	±1
1	C10	15pF	Murata	GRM1555C1H150JZ01D	0402	50V	±
1	C9	10nF	Samsung	CL05B103KB5NNNC	0402	50V	±1
1	C2	150uF	Panasonic	16TQC150MYF	TANTSMD/D	16V	±2
2	C6, C7	22uF	Murata	GRM21BD71A226ME44L	0805	10V	±2
1	R3	75k	KOA Speer	RK73H1ETTP7502F	0402	-	±
2	R4,R6	0	Panasonic	ERJ-2GE0R00X	0402	-	
1	R5	200k	ROHM	MCR01MRTF2003	0402	-	±
1	R2	10	Yageo	RC0402FR-0710RL	0402	-	±
1	R11	59k	Panasonic	ERJ-2RKF5902X	0402	-	±
1	R9	143k	Vishay	CRCW0402143KFKxx	0402	-	±
1	R10	84.5k	Panasonic	ERJ-2RKF8452X	0402	-	±
1	R8	604k	Panasonic	ERJ-2RKF6043X	0402	-	±
1	R1	100k	Panasonic	ERJ-2RKF1003X	0402	-	±
1	U1	EN6338QI	Intel	EN6338QI	aEASI-19Pin_3.75x3.75	-	

WHERE TO GET MORE INFORMATION

For more information about Intel and Intel Enpirion PowerSoCs, visit:

https://www.altera.com/products/power/overview.html

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