EN6340QI 4A PowerSoC

Step-Down DC-DC Switching Converter with Integrated Inductor

EVALUATION BOARD OVERVIEW

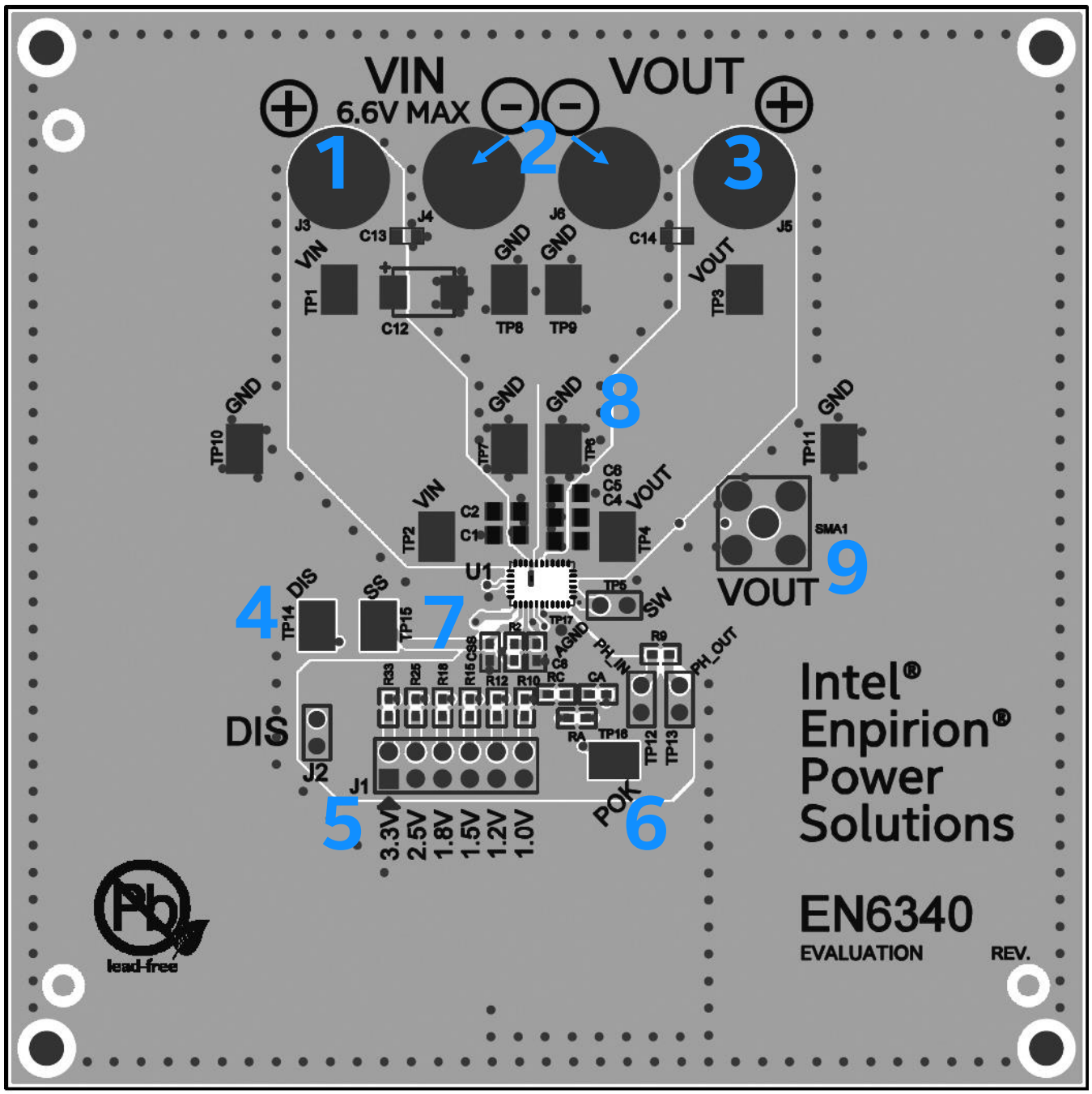


Figure 1: Evaluation Board (EVB) Features (Top View)

NOTE A: The EN6340QI 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 (J3). 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 (J4, J6).

3) Output Voltage (VOUT) - Connect the load to VOUT (J5). If the instructions were followed up to this point, the device may be powered on.

4) Disable (DIS) – The ENABLE is pulled high to VIN through an internal resistor divider. Connecting a jumper on DIS (J2) will disable the device. An external signal may be applied to the DIS (TP14) to enable (>1.8V) or disable (<0.6V) the device.

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 R33, R25, R18, R12, R10 which corresponds to 3.3V, 2.5V, 1.8V, 1.2V and 1.0V respectively. The compensation CA 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.

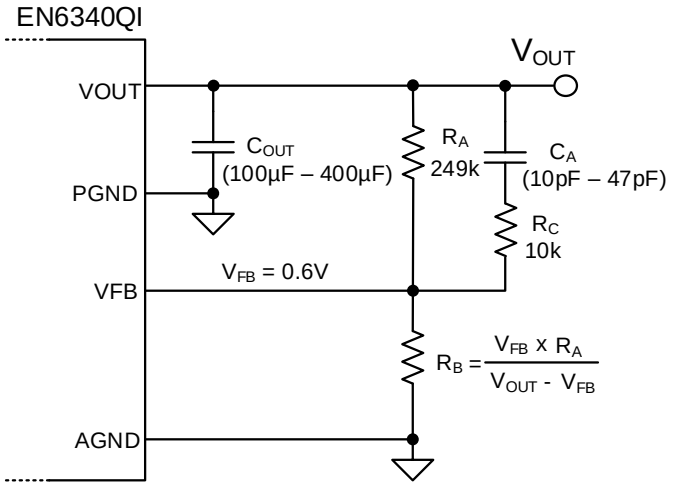


Figure 2: VOUT Resistor Divider & Compensation Capacitor

6) Power OK (POK) - This is the open drain Power OK flag, which is pulled high to AVIN internally by a 100k resistance. When VOUT is over 90% of regulation, POK will be pulled high to AVIN.

Table 1: External Compensation Recommendations

VIN	VOUT	RB	CA	RA	RC	COUT (0805)
3.3V	1.0V	374kΩ	18pF	249kΩ	10kΩ	2 x 47µF
	1.2V	249kΩ	15pF			
	1.5V	165kΩ	15pF			
	1.8V	124kΩ	15pF			
	2.5V	78.7kΩ	12pF			
5V	1.0V	374kΩ	15pF	249kΩ	10kΩ	2 x 47µF
	1.2V	249kΩ	15pF			
	1.5V	165kΩ	15pF			
	1.8V	124kΩ	12pF			
	2.5V	78.7kΩ	12pF			
	3.3V	54.9kΩ	10pF			

7) Soft Start Capacitor (CSS) – The soft start capacitor (C7) is 15nF by default and can be between 10nF to 100nF. The output rise time is controlled by C_{SS}. The voltage rise time calculation is shown:

Rise Time → t_{RISE} [ms] = C_{ss} [nF] x 0.13

C_{SS} = 10nF → $t_{RISE} \approx$ 1.3ms

C_{SS} = 100nF → $t_{RISE} \approx$ 13ms

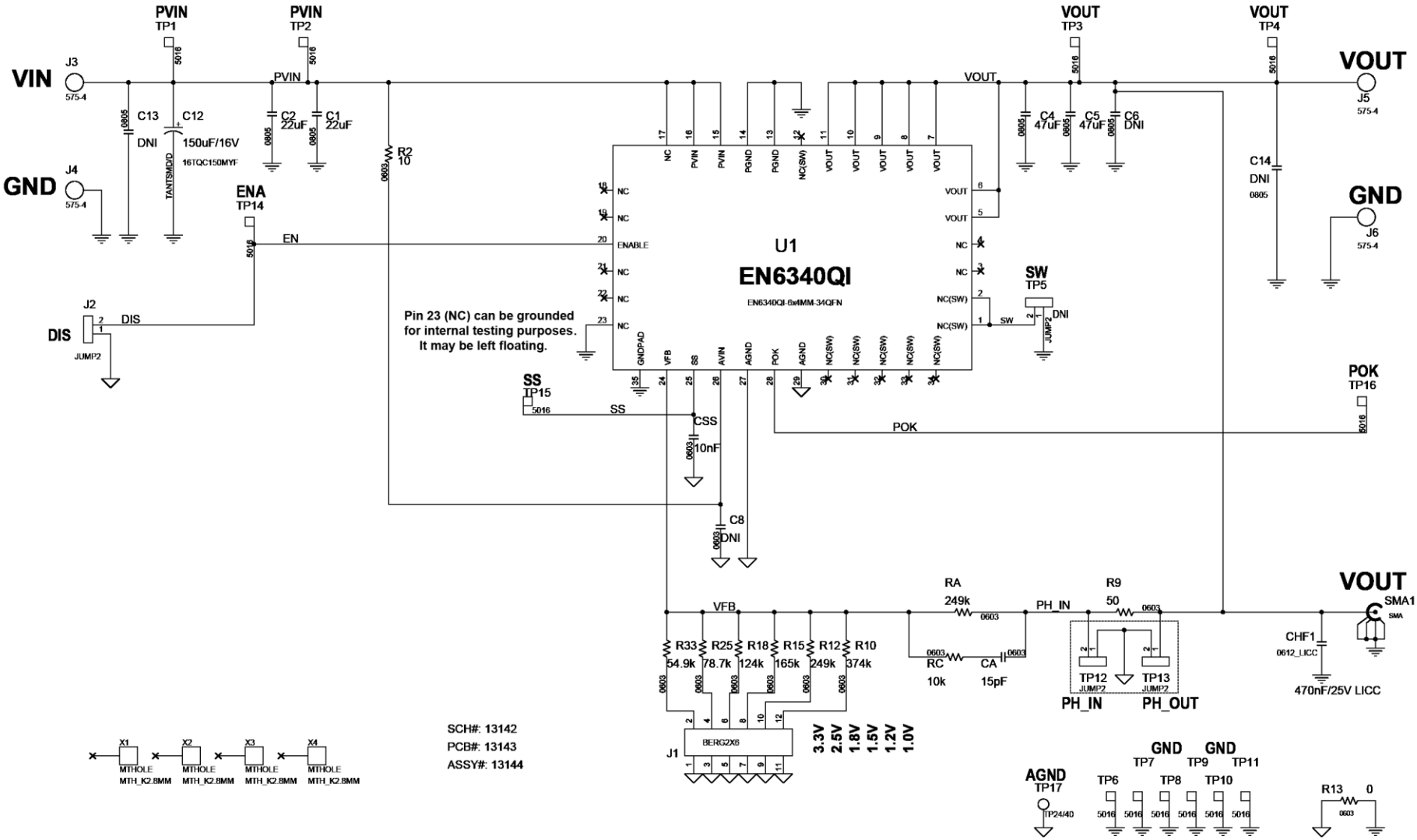
8) Bulk Capacitors – The EN6340QI may support up to 400µF on the output, but the compensation should be adjusted accordingly. Using Table 1 as the reference for C_A, if C_{OUT} is increased, then the C_A should also be increased. The relationship is linearly shown below:

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

The recommended maximum output capacitance (C_{OUT_MAX}) is 400µF and phase-lead capacitance (C_{A_MAX}) is 47pF

9) 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	Tolerance	Power	Dielectric
1	CA	15pF	Murata	GRM1885C1H150JA01D	0603	50V	5%		
1	CHF1	470nF	Murata	LLL31MR71E474MA01L	0612_LICC	25V			
1	CSS	10nF	Johanson Dielectrics	500X14W103MV4T	0603	50V	±20%		
2	C1,C2	22u	SAMSUNG	CL21A226MAQNNNE	0805	25V	±20%		X5R
2	C4,C5	47uF	Taiyo Yuden	JMK212BJ476MG-T	0805	6.3V	±20%		X5R
1	C12	150uF/16V	Panasonic	16TQC150MYF	TANTSMD/D	16V	20%		
2	R12,RA	249k	Yageo	9C06031A2493FKHFT	0603		±1%		
1	RC	10k	Yageo	RC0603FR-0710KL	0603		±1%	1/10W	
1	R2	10	NIC	NRC06F10R0TRF	0603		±1%		
1	R9	50	Vishay	FC0603E50R0BTBST1	0603		±1%	1/8W	
1	R10	374k	Yageo	RC0603FR-07374KL	0603		±1%		
1	R13	0	Panasonic	ERJ-3GEY0R00V	0603			1/10W	
1	R15	165k	Panasonic	ERJ3EKF1653V	0603		±1%		
1	R18	124k	Panasonic	ERJ-3EKF1243V	0603		±1%		
1	R25	78.7k	Panasonic	ERJ-3EKF7872V	0603		±1%		
1	R33	54.9k	Yageo	RC0603FR-0754K9L	0603		±1%		
1	U1	EN6340QI	Intel	EN6340QI	EN6340QI-6x4x2.5 - 34QFN				

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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Intel:
EVB-EN6340QI