APEK8660

A8660 Evaluation Board User Guide

DESCRIPTION

The A8660 Evaluation Board is designed to help system designers evaluate the operation and performance of the A8660 synchronous buck regulator module. The A8660 evaluation board output voltage is configured for an output voltage of 5 V at up to 10 A with a 410 kHz switching frequency.

FEATURES

- A8660 synchronous buck converter
- Several test point for ease of access to common signals of interest

EVALUATION BOARD CONTENTS

- APEK8660 evaluation board

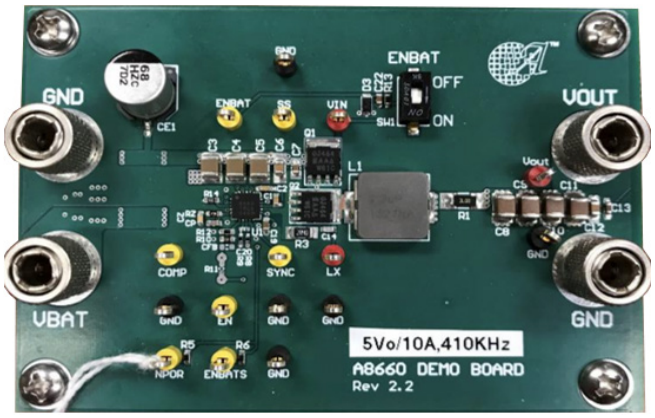

Figure 1: APEK8660 Evaluation Board

Table of Contents

Table 1: A8660 Evaluation Board Configurations

Part Number	Package
APEK8660KES-01-10-410K-T	20-lead QFN

Table 2: General Specifications

Specification	Min.	Typ.	Max.	Units
Input Voltage	3.0	–	45	V
Output Voltage	–	5	–	V
Output Current	0	–	10	A
Switching Frequency	–	410	–	kHz

USING THE EVALUATION BOARD

This section provides an overview of the connections and configuration options of the APEK8660 evaluation board. Each group of connections is highlighted in Figure 2 and detailed in the material that follows. For more detailed information about the use and functionality of each pin, refer to the A8660 datasheet.

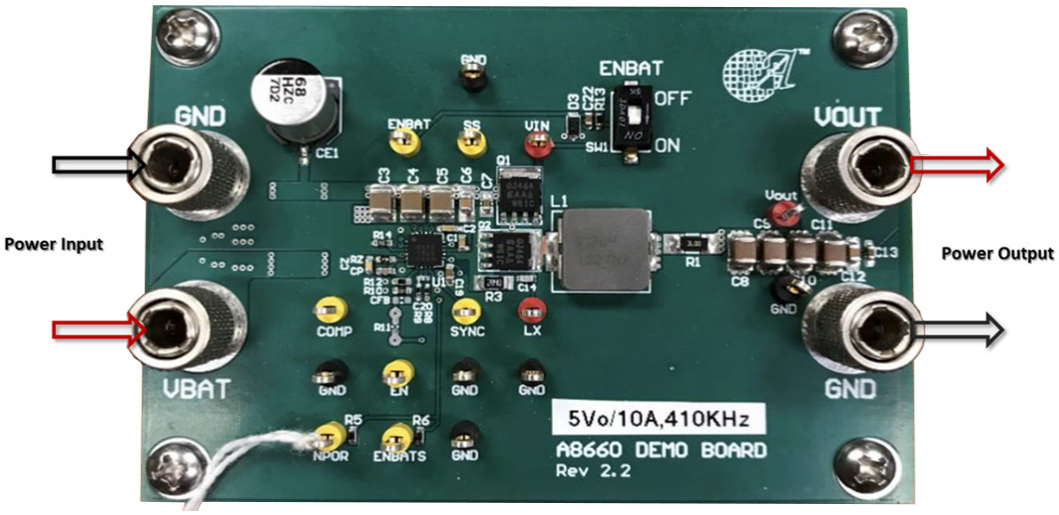

Figure 2: A8660 Evaluation Board I/O Connections

POWER INPUT

Connect a power supply using banana cables to the VBAT and GND through hole banana jack. Set the ENBAT switch to ON or provide a logic high on the EN test point to enable the A8660.

DEVICE CONFIGURATION

The A8660 evaluation board is configured for 5 V and up to 10 A, switching at 410 kHz. Consult the A8660 datasheet for details about all device configuration options.

Test points on the evaluation board are used to monitor or exercise the A8660. For a description of each test point, see Table 3.

Table 3: Test Point Descriptions

Test Point	Description
VIN	Positive terminal for input voltage connection or sensing.
VOUT	Positive terminal for output voltage connection or sensing
GND	Negative terminal for voltage input/output or sensing.
EN	EN pin external logic input.
ENBAT	ENBAT test point to monitor signal at ENBAT pin.
ENBATS	ENBAT status indictor pin test point.
SS	Soft-start pin voltage monitor test point.
SYNC	Clock synchronization input test point for input frequency <520 kHz.
LX	Switch node test point.
COMP	Control loop compensation node test point.
NPOR	Monitor test point for NPOR signal, where a logic low indicates the output is out of regulation.

Allegro MicroSystems
955 Perimeter Road
Manchester, NH 03103-3353 U.S.A.
www.allegromicro.com

SCHEMATIC

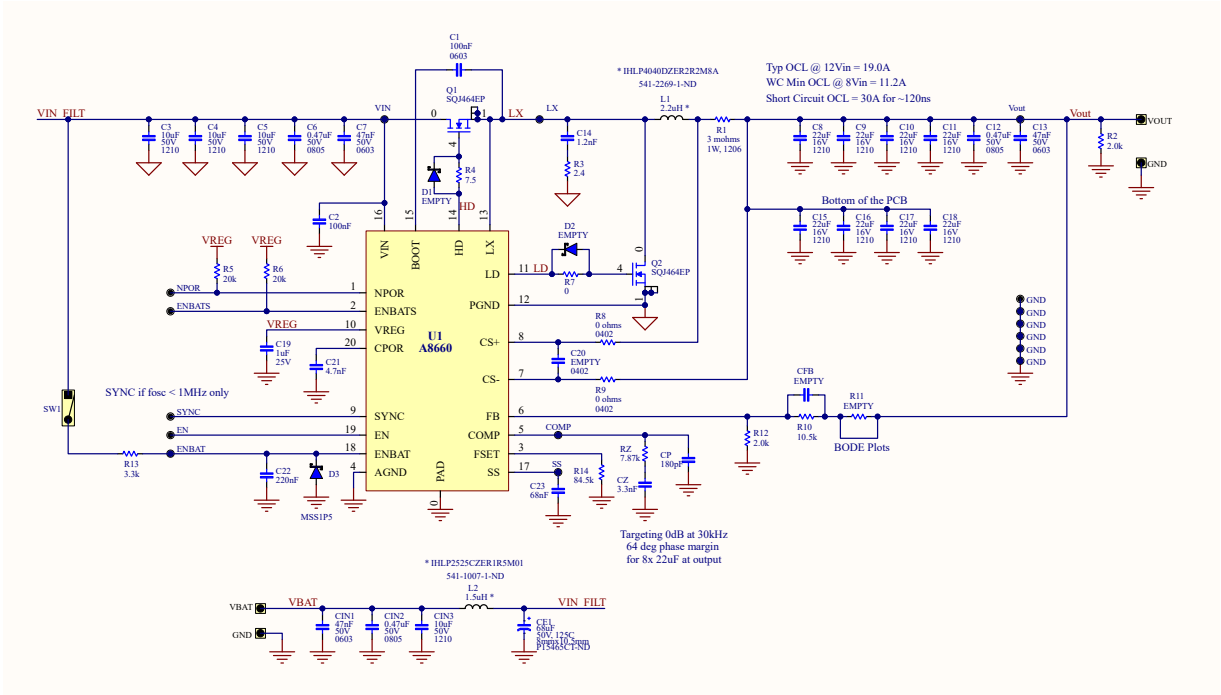

Figure 3: APEK8660 Evaluation Board Schematic

Allegro MicroSystems
955 Perimeter Road
Manchester, NH 03103-3353 U.S.A.
www.allegromicro.com

LAYOUT

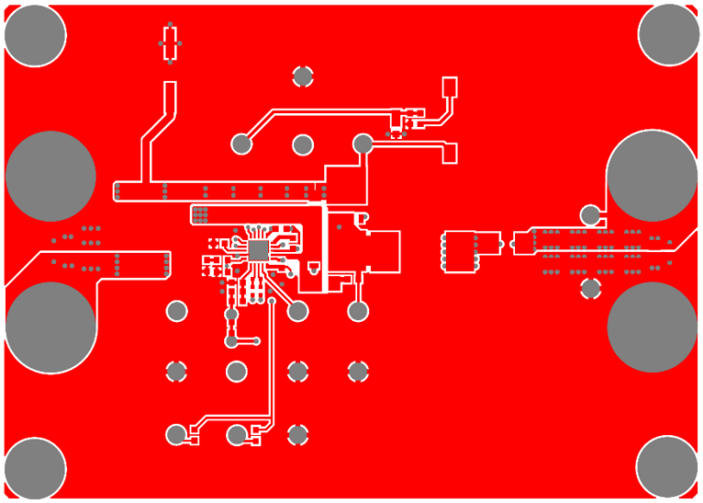

Figure 4: Top Layer

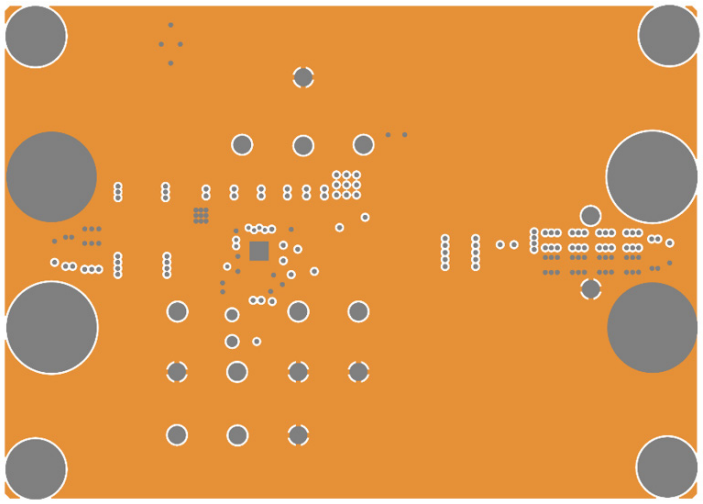

Figure 5: Inner Layer 1

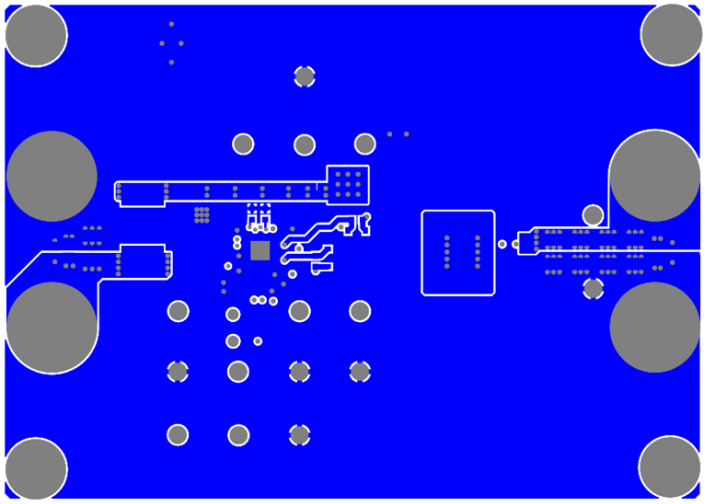

Figure 6: Bottom Layer

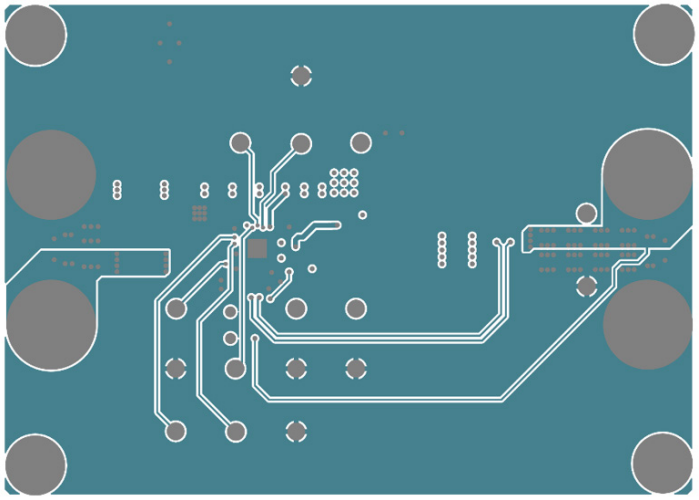

Figure 7: Inner Layer 2

Allegro MicroSystems
955 Perimeter Road
Manchester, NH 03103-3353 U.S.A.
www.allegromicro.com

BILL OF MATERIALS

Table 2: APEK8660KES-01-10-410K-T Evaluation Board Bill of Materials

Designator	Description	Footprint	Qty	Manufacturer	Manufacturer Part Number
Electrical Components					
U1	A8660, Synchronous Buck Controller	QFN-20, 4 mm × 4 mm	1	Allegro MicroSystems	A866
R1	Resistor, 3 mΩ, 1 W, 1%	1206	1	Rohm Stackpole	PMR18EZPFV3L00 CSNL1206FT3L00
R2, R12	Resistor, 2 kΩ, 1/10 W, 1%	0603	2	Yageo	RC0603FR-072KL
R3	Resistor, 2.4 Ω, 1/4 W, 1%	1206	1	Yageo	RC1206FR-072R4L
R4	Resistor, 7.5 Ω, 1/10 W, 1%	0603	1	Yageo	RC0603FR-077R5
R5, R6	Resistor, 20 kΩ, 1/10 W, 1%	0603	2	Yageo	RC0603FR-0720KL
R7	Resistor, 0 Ω	0603	1	Stackpole	RMCF0603ZT0R00
R8, R9	Resistor, 0 Ω	0402	2	Stackpole	RMCF0402ZT0R00
R10	Resistor, 10.5 kΩ, 1/10 W, 1%	0603	1	Yageo	RC0603FR-0710K5L
R13	Resistor, 3.3 kΩ, 1/10 W, 1%	0603	1	Yageo	RC0603FR-073K3L
R14	Resistor, 86.6 kΩ, 1/10 W, 1%	0603	1	Yageo	RC0603FR-0786K6L
RZ	Resistor, 7.87kΩ, 1/10 W, 1%	0603	1	Yageo	RC0603FR-077K87L
CE1	Capacitor, Electrolytic, Hybrid, 68 µF, 50 V, 30 mΩ, –55°C to 125°C	SMT, 8 mm × 10.5 mm	1	Panasonic	EEH-ZC1H680P
C1	Capacitor, Ceramic, 100 nF, 25 V, 10%, X7R	0603	1	Yageo	CC0603KRX7R8BB104
C2	Capacitor, Ceramic, 100 nF, 50 V, 10%, X7R	0603	1	Yageo	CC0603KRX7R9BB104
C3, C4, C5, CIN3	Capacitor, Ceramic, 4.7 µF, 50 V, X7R, 10%	1210	4	Samsung	CL32B475KBUYNWE
C6, C12, CIN2	Capacitor, Ceramic, 0.47 µF, 50 V, 10%, X7R	0805	3	Samsung	CL21B474KBFNNNG
C7, C13, CIN1	Capacitor, Ceramic, 47 nF, 50 V, 10%, X7R	0603	3	Kemet	C0603C473K5RAC7867
C8, C9, C10, C11, C15, C16, C17, C18	Capacitor, Ceramic, 22 µF, 16 V, X7R, 10%	1210	8	Samsung	CL32B226KOJNNNE
C14	Capacitor, Ceramic, 1.2 nF, 50 V, X7R	0603	1	Kemet	C0603C122K5RAC7867
C19	Capacitor, Ceramic, 1 µF, 25 V, X7R	0603	1	Samsung	CL10B105KA8NNNC
C21	Capacitor, Ceramic, 4.7 nF, 50 V, X7R	0603	1	Samsung	CL10B472KB8NNNC
C22	Capacitor, Ceramic, 220 nF, 50 V, X7R	0603	1	TDK	C1608X7R1H224K080AE
C23	Capacitor, Ceramic, 68 nF, 50 V, X7R	0603	1	Samsung	CL10B683KB8WPNC
CZ	Capacitor, Ceramic, 3.3 nF, 50 V, X7R	0603	1	Samsung	CL10B332KB8NNNC
CP	Capacitor, Ceramic, 180 pF, 50 V, COG	0603	1	Cal-Chip Electronics	GMC10CG181G50NT
D3	Diode, Schottky, 1 A, 50 V	eSMP	2	Vishay	MSS1P5-M3/89A
L1	Inductor, 2.2 µH, 12 ADC, 25.6 ASAT, 8.2 mΩ @ 25°C	10.8 mm × 10.3 mm × 4.0 mm	1	Vishay	IHLP4040DZER2R2M01
L2	Inductor, 1.5 µH, 9 ADC, 18 ASAT, 14 mΩ @ 25°C	6.5 mm × 6.9 mm × 3 mm	1	Vishay	IHLP2525CZER1R5M01
Q1, Q2	MOSFET, N-Channel, 60 V, 32 A, 14 mΩ	PowerPAK SO8	2	Vishay	SQJ464EP-T1_GE3
VIN, VOUT, LX	Test Points, Red, 0.063" diameter	0.063"	3	Keystone	5010
COMP, SS, SYNC, EN, ENBAT, ENBATS, NPOR	Test Points, Yellow, 0.063" diameter	0.063"	7	Keystone	5009
GND	Test Points, Black, 0.063" diameter	0.063"	6	Keystone	5011
SW1	DIP Switch, 1 position	SMT	1	C & K Components	SDA01H0SBR
D1, D2, C20, CFB, R11	Empty	Various	0		
Mechanical Components					
M1, M2, M3, M4	Binding Post Connector, Knurled, Nickel	Banana1	4	Johnson / Cinch	111-2223-001
S1, S2, S3, S4	Standoff, Hex, Alum., 1/4" x 0.5", #6-32 threads	Metal Standoff	4	Keystone	2210
SCREW, Standoff	Screws, 0.375" length, #6-32 threads	N/A	4	Keystone	9904

Allegro MicroSystems
955 Perimeter Road
Manchester, NH 03103-3353 U.S.A.
www.allegromicro.com

RELATED LINKS

A8660 Product Page: https://www.allegromicro.com/en/products/regulate/regulators/single-output-regulators/a8660

A8660 Datasheet: https://www.allegromicro.com/-/media/files/datasheets/a8660-datasheet.pdf

APPLICATION SUPPORT

For applications support contact, go to https://www.allegromicro.com/en/about-allegro/contact-us/technical-assistance and navigate to the appropriate region.

Allegro MicroSystems
955 Perimeter Road
Manchester, NH 03103-3353 U.S.A.
www.allegromicro.com

Revision History

Number	Date	Description
–	January 25, 2024	Initial release

Allegro MicroSystems
955 Perimeter Road
Manchester, NH 03103-3353 U.S.A.
www.allegromicro.com