4.7V to 18V Input, 5A Synchronous Buck Regulators with AOT Control

Brief Description

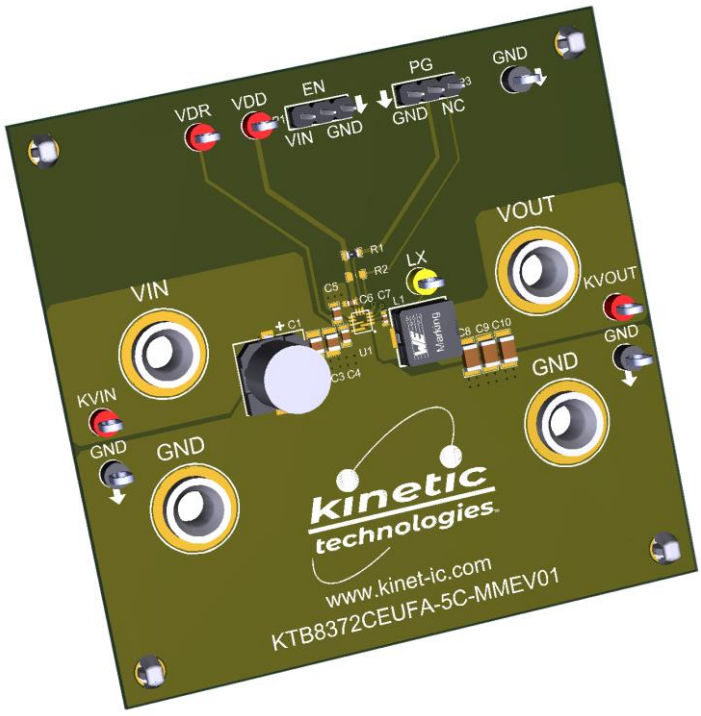
This Manual describes the detailed operation of the KTB8372 evaluation board. KTB8372 is an adaptive-on-time (AOT) buck switching regulator with class-leading accuracy, transient response, efficiency, and solution size optimized for Server, Tablet and Ultra-Book applications. The KTB8372 Evaluation (EVAL) board is used to demonstrate the KTB8372 Buck regulator detailed functionality, performance, and the PCB layout.

The kit includes a fully assembled and tested KTB8372 EVAL board and a printed copy of the Quick Start Guide.

Ordering Information

Part Number	Description	IC Package
KTB8372CEUFA-5C-MMEV01	KTB8372 EVAL Kit	UQFN-11

3D CAD Image



EVAL Kit Physical Contents

Item #	Description	Included	Download
1	KTB8372 EVAL fully assembled PCB in Anti-static bag	1	
2	Hard copy of Quick Start Guide, 1 page (A4 or US Letter)	1	
3	EVAL Kit box	1	
4	EVAL Kit Manual, available at clickable URL		1

QR Links for Documents

IC Datasheet	EVAL Kit Landing Page
https://www.kinet-ic.com/KTB8372/	https://www.kinet-ic.com/KTB8372CEUFA-5C-MMEV01/

User-Supplied Equipment

Required Equipment

1. Bench Power Supply for VIN – 20V and 5A as needed for the intended application.
2. Digital Multimeter – used to measure input/output voltages and currents.
3. Load – either power resistors, an E-Load, or an actual system load.

Optional Equipment

1. Oscilloscope and Voltage Probes – for dynamic testing, measurements, and observe input/output voltages and currents waveforms.
2. Additional Digital Multimeters

Recommended Operating Conditions

Symbol	Description	Value	Units
VIN	Input Withstand Voltage	-0.3 to 19	V
	Input Operating Voltage	4.7 to 18	V
I_{OUT}	Output Load Current	0 to 5	A

Jumper Descriptions

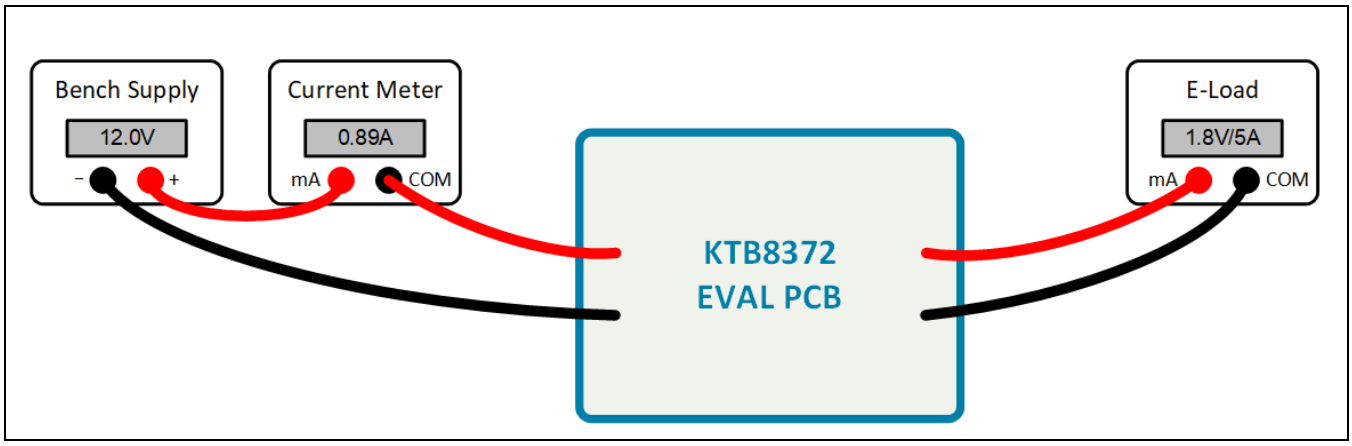
Designator	Name	Description	Default
P1	EN	Active-Low Enable Input: L: Shutdown Mode – switch disabled H: Enable Mode through VIO – normal switch operation	H
P3	PG	Open-drain Power Good Indicator Output. Connect a pull-up resistor between PG pin and VDD pin, a resistor ranges from 10kΩ to 100kΩ is recommended. This pin is pulled to ground when the output voltage is outside of its specified threshold. If not used, tie to AGND or PGND.	-
TP5	VDD	Analog circuit bias voltage	-
TP6	VDR	Power stage driver voltage	-
TP7	LX	Inductor connection for buck regulator.	-
CN1	VIN	Connecting Header for VIN	-
CN2	GND	Connecting Header for GND	-
CN3	VOUT	Connecting Header for VOUT	-
CN4	GND	Connecting Header for GND	-

Quick Start Procedures

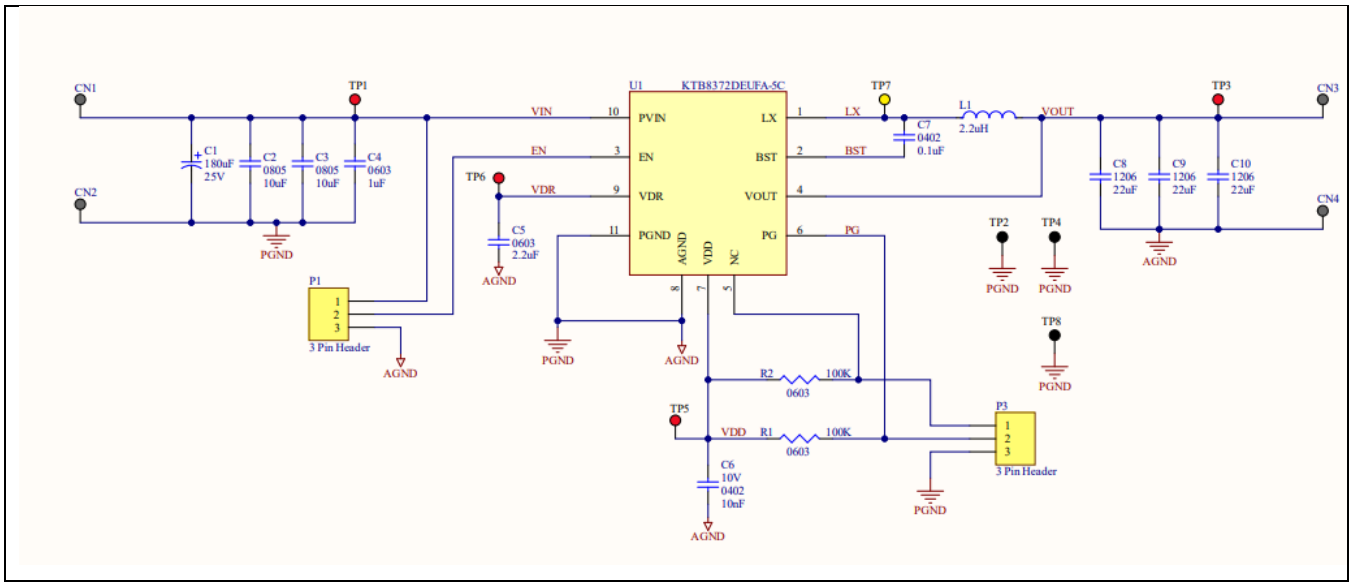
1. EVAL Kit Landing page (https://www.kinet-ic.com/KTB8372CEUFA-MMEV01/).
2. Check the Jumpers for default setting.
3. Connect one pair of power cables to the connector of EVAL Kit at VIN and GND.
4. Before connecting the EVAL Kit to the VIN bench supply, turn on the supply and adjust the voltage as close to 0V as possible. Then turn off the supply. While off, connect the power cables ends to the VIN bench supply.
5. Turn on the VIN bench supply and very slowly ramp its voltage to an appropriate voltage, such as 12V. While ramping VIN slowly, use the bench supply's output current indication (or a digital multimeter) to monitor the VIN current. If the current becomes high, reduce the VIN voltage quickly to prevent damage. Then inspect the setup for any wiring errors.
6. To hardware shutdown the buck regulator, simply use a jumper at P1 to connect EN to GND.
7. Connect a voltage meter to the output KVOUT and KGND test pins, it should measure 1.8V.

Typical Test Setup Diagram

As an example, use the following test setup to measure input/output in the Quick Start Procedures.



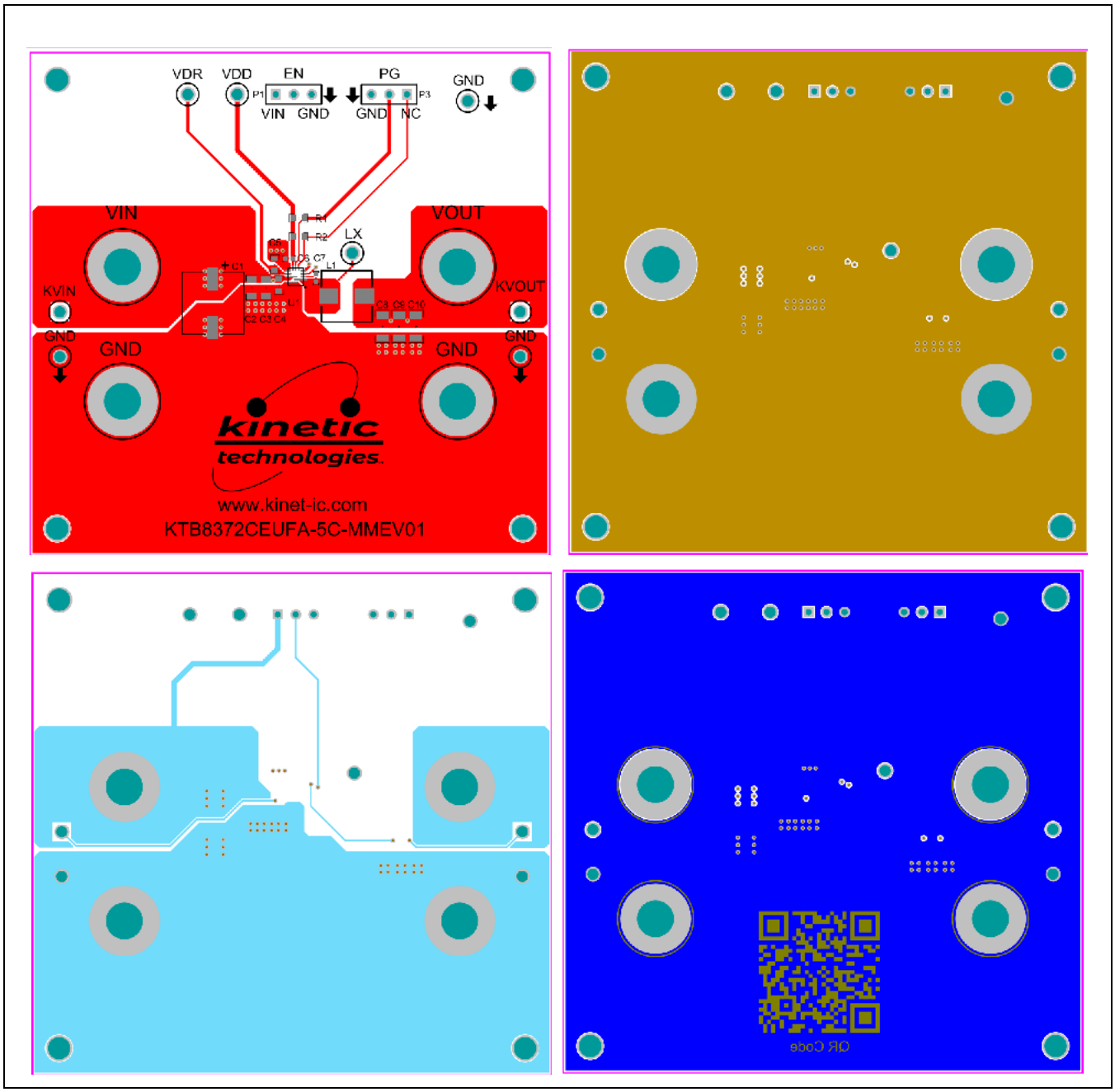
Electrical Schematic



Bill of Materials (BOM)

Quantity	Designator	Description	Value	Package	Manufacturer	Manufacturer Part Number
1	C1	CAP ALUM POLY 180UF 20% 25V SMD	180uF		Panasonic	25SVPF180M
2	C2, C3	CAP 10uF 25V 1206	10uF	0805	Samsung	CL21A106KAYNNNE
1	C4	CAP CER 1uF 25V X5R 0603	1uF	0603	Samsung	CL10A105KA8NNNC
1	C5	CAP CER 2.2UF 10V X5R 0603	2.2uF	0603	Samsung	CL10A225KP8NNNC
1	C6	CAP CER 10000PF 10V X5R 0402	10nF	0402	Samsung	CL05B103KB5NNNC
1	C7	CAP CER 0.1UF 10V X5R 0402	0.1uF	0402	Samsung	CL05A104KA5NNNC
3	C8, C9, C10	CAP CER 22UF 10V X5R 1206	22uF	1206	Samsung	CL31A226KPHNNNE
4	CN1, CN2, CN3, CN4	CONN BANANA JACK SOLDER		TH	Keystone Electronics	575-4
4	H1, H2, H3, H4	BRD SPT SNAP LOCK REST MNT 4MM			Essentra Components	PSD-4M-19
1	L1	FIXED IND 2.2UH 9A 11.4 MOHM SMD	2.2uH	7040	Wurth Elektronik	744311220
2	P1, P3	CONN HEADER VERT 3POS 2.54MM		Through Hole	Sullins	PREC003SAAN-RC
2	R1, R2	RES 100K OHM 1% 1/10W 0603	100K	0603	Yageo	RC0603FR-07100KL
4	TP1, TP3, TP5, TP6	PC TEST POINT MULTIPURPOSE RED		Through Hole	Keystone	5010
3	TP2, TP4, TP8	PC TEST POINT MULTIPURPOSE BLACK		Through Hole	Keystone	5011
1	TP7	PC TEST POINT MULTIPURPOSE YELLOW		Through Hole	Keystone	5014
1	U1	4.7V to 17V Input, 5A Synchronous Buck Regulators with AOT Control		SOIC-16	Kinetic Technologies	KTB8372CEUFA-5C-TR

Printed Circuit Board (PCB)

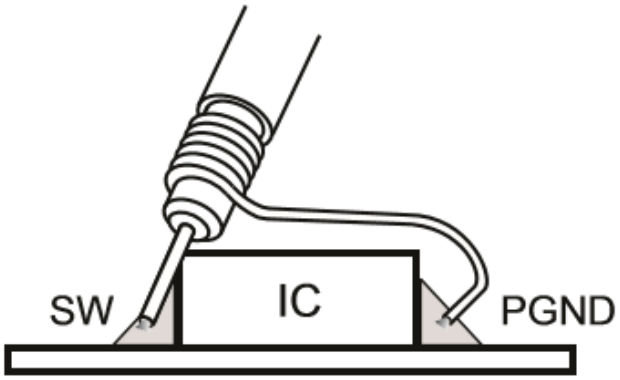


Buck Regulator Efficiency Measurement

Use a voltage meter to probe EVB test pins KVIN and KGND to measure input voltage, and KVOUT and KGND to measure output voltage. Also, connect current meter in series to input voltage source and output load.

The efficiency can be determined using equation:

$$\text{Efficiency (\%)} = [\ (V_{out} \times I_{out}) / (V_{in} \times I_{in})\ ] \times 100\%$$



Low Inductance Probe Connection

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