Introduction

The AAT1152 MSOP evaluation board demonstrates performance, along with the suggested size and placement of external components, for the AAT1152 integrated buck regulator. The external components are selected for minimum size and optimum operation up to 1A output current. Please refer to the AAT1152 datasheet for more details about this product.

Layout

As with all switching power supplies, board layout for the AAT1152 is critical (see Figure 1). Special care has been taken with the placement of the external components. The input capacitor (C1) placement is critical and it must be located immediately adjacent to the AAT1152. As shown in Figure 2, the LX node trace has been routed under C1 in order to facilitate placement of C1 close to the IC. The output voltage feedback trace has been routed on the portion of backside of the board which has a ground plane on the top side (see Figure 3). The trace is routed to avoid the LX node and associated noise. Please refer to Table 1 for AAT1152 evaluation board specifications.

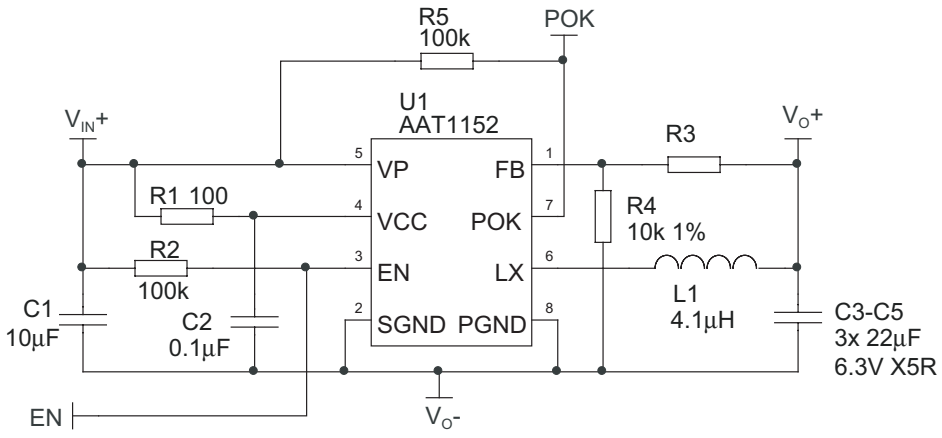

Figure 1: AAT1152 Evaluation Board Schematic.

Specification	Test Conditions	Min	Typ	Max	Units
Input Voltage		2.7	3.6	5.5	V
Output Error Voltage			±3		%
Output Current		0		1.0	A

Table 1: AAT1152 Evaluation Board Specification.

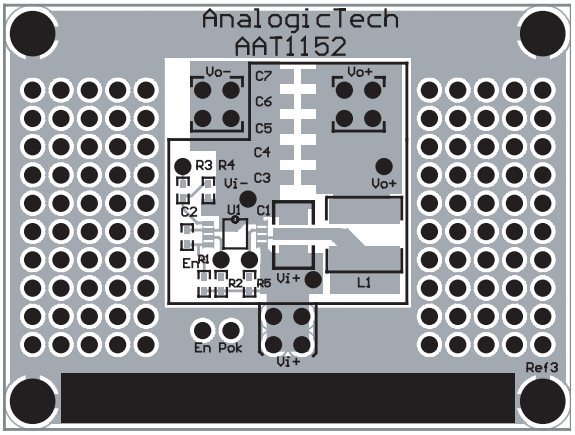

Figure 2. AAT1152 Evaluation Board PCB Top Side.

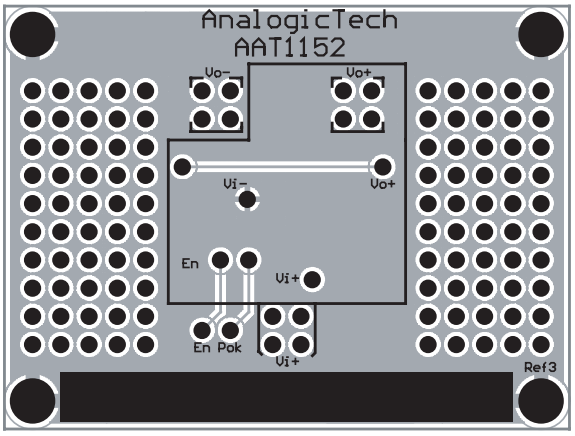

Figure 3. AAT1152 Evaluation Board PCB Bottom Side.

Test Equipment

1. 6.0V 2.0A laboratory power supply: HP33401A or equivalent.
2. DC 0A to 1.0A load capable of operation down to 1.0V: Keithley 2400 or equivalent. When using the Keithley 2400, set the meter to 0V in voltage source mode and set the load current by varying the current compliance (maximum current) of the meter.
3. DC voltmeter: HP34401A or equivalent.
4. Oscilloscope: Tektronix TDS744A or equivalent.

Setup and Test

A: Load and Line Regulation (see connection diagram in Figure 4)

1. Apply a DC power supply and DC voltmeter across input voltage terminals: V_{IN}+ (positive terminal) and GND (negative terminal or return).
2. Apply a DC load and DC voltmeter to output terminals: V_O+ and GND.
3. Vary the load from 0A to 1.0A and the input voltage from 2.7V to 5.5V while monitoring the output voltage.
4. The output voltage as measured at the output terminals of the evaluation board should not vary by more than ±3% of the nominal voltage.

B: Short-Circuit and Over-Temperature Protection

1. Raise the input voltage to 5.5V
2. Apply a short from V_O+ to GND at the evaluation board terminals.
3. Remove the short and verify that output returns to its initial value.

C: Enable Input

1. Short the enable pin to GND. The output should decay to zero and the Power OK output should go low.
2. Remove the short applied to the enable pin. The output should recover to its initial value and the power OK output should return to the input voltage.

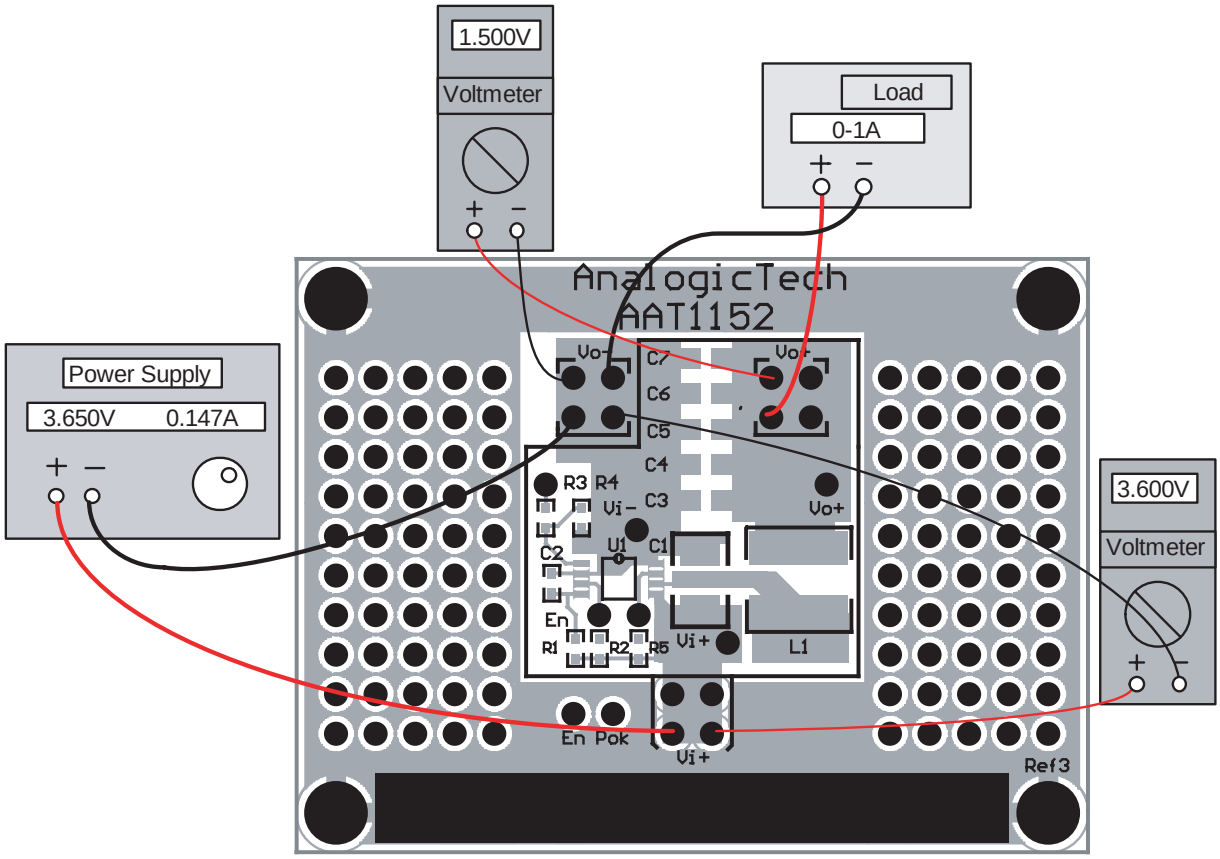

Figure 4: AAT1152 Connection Diagram.

Component	Part Number	Description	Manufacturer
U1	AAT1152IKS-1.0-T1	1.0V 1A Buck Converter	AnalogicTech
U1	AAT1152IKS-1.8-T1	1.8V 1A Buck Converter	AnalogicTech
U1	AAT1152IKS-2.5-T1	2.5V 1A Buck Converter	AnalogicTech
U1	AAT1152IKS-3.3-T1	3.3V 1A Buck Converter	AnalogicTech
C3, C4, C5	GRM21BR60J226KE19	22µF, 6.3V, X5R, 10%, 0805	MuRata
C1	GRM319R60J106KE01	10µF, 6.3V, X5R, 10%, 1206	MuRata
C2	GRM155R61A104KA01	0.1µF, 25V, X5R, 10%, 0402	MuRata
R1	Chip Resistor	100kΩ, 5%, 1/16W; 0402	Vishay
R2	Chip Resistor	100kΩ, 5%, 1/16W; 0402	Vishay
L1	CDRH5D18-4R1	4.1µH, 57mΩ, 1.95A Shielded	Sumida
R3	Chip Resistor	AAT1152KS-1.0-T1 Table 3, 1%, 1/16W; 0402	Vishay
		AAT1152IKS-1.8-T1 0Ω, 0402	Vishay
		AAT1152IKS-2.5-T1 0Ω, 0402	Vishay
		AAT1152IKS-3.3-T1 0Ω, 0402	Vishay
R4	Chip Resistor	10kΩ, 1%, 1/16W; 0402 (required with AAT1152IKS-1.0-T1 when output is >1.0V only)	Vishay

Table 2: AAT1152 EVAL Bill of Materials.

Output Voltage

For an adjustable output, set R4 to 10kΩ and select R3 according to Table 3 using the AAT1152IKS-1.0-T1.

V_O (V)	R3 (kΩ)
1.0	0.00 (short)
1.1	1.00
1.2	2.00
1.25	2.55
1.3	3.01
1.4	4.02
1.5	4.99
1.6	6.04
1.7	6.98
1.8	8.06
1.85	8.45
1.9	9.09
2.0	10.0
2.1	11.0
2.2	12.1
2.3	13.0
2.4	14.0
2.5	15.0
3.3	23.2

Table 3: Resistor Selection for Adjustable Output Voltage (R4 = 10kΩ).

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