Switching Regulator Series

Isolated Flyback DC/DC Converter BD7F100EFJ-LB Evaluation Board

BD7F100EFJ-EVK-002 (24V→±15V, 0.165A)

BD7F100EFJ-EVK-002 Evaluation board delivers outputs 15volts and -15 volts from an input 24 volts using BD7F100EFJ-LB, Isolated Flyback DC/DC converter integrated circuit, with output current rating of maximum 0.165A.

Performance specification

These are representative values, and it is not a guaranteed against the characteristics.

V_{IN} = 24V, V_{OUT1} = 15V, V_{OUT2} = -15V, Unless otherwise specified.

Parameter	Min	Typ	Max	Units	Conditions
Input Voltage		24.0		V	
Output Voltage 1		15.0		V	R4=3.9kΩ, R5=76.8kΩ
Output Voltage 2		-15.0		V	R4=3.9kΩ, R5=76.8kΩ
Output Current 1 Range	3.2		165	mA	Maximum Output Power:5W
Output Current 2 Range	3.2		165	mA	
Operating Frequency		400		kHz	
Maximum Efficiency		81.7		%	I_O = 165mA

Evaluation Board

PCB size: 70mm×50mm×1.6mm

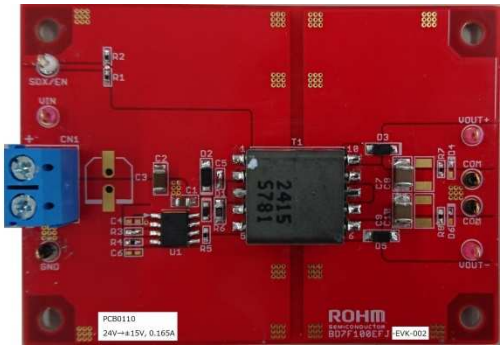

Figure 1. BD7F100EFJ-EVK-002 Evaluation Board

Top View

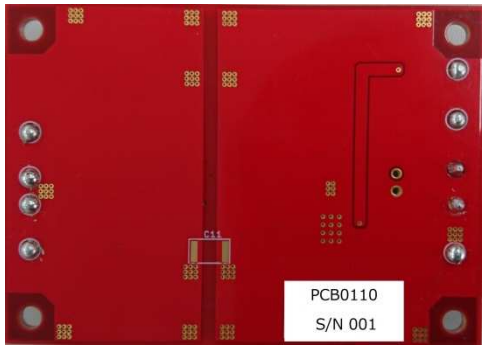

Figure 2. BD7F100EFJ-EVK-002 Evaluation Board

Bottom View

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Operation Procedures

1. Necessary equipments

(1) DC power-supply of 24V/0.5A

(2) Maximum 0.165A load per output

(3) DC voltmeter

2. Connecting the equipments

(1) DC power-supply presets to 24V and then the power output turns off.

(2) The maximum load should be set at 165mA and over it will be disabled.

(3) Connect positive-terminal of power-supply to VIN terminal and negative-terminal to GND terminal with a pair of wires.

(4) Connect positive-terminal of load 1 to VOUT+ terminal and negative-terminal to COM terminal with a pair of wires.

(5) Connect positive-terminal of load 2 to COM terminal and negative-terminal to VOUT- terminal with a pair of wires.

(6) Connect positive-terminal of DC voltmeter 1 to VIN and negative-terminal to GND for input-voltage measurement.

(7) Connect positive-terminal of DC voltmeter 2 to VOUT+ and negative-terminal to COM for output-voltage measurement.

(8) Connect positive-terminal of DC voltmeter 3 to VOUT- and negative-terminal to COM for output-voltage measurement.

(9) DC power-supply output is turned ON.

(10) Check DC voltmeter 2 displays 15V.

(11) Check DC voltmeter 3 displays -15V.

(12) The load is enabled.

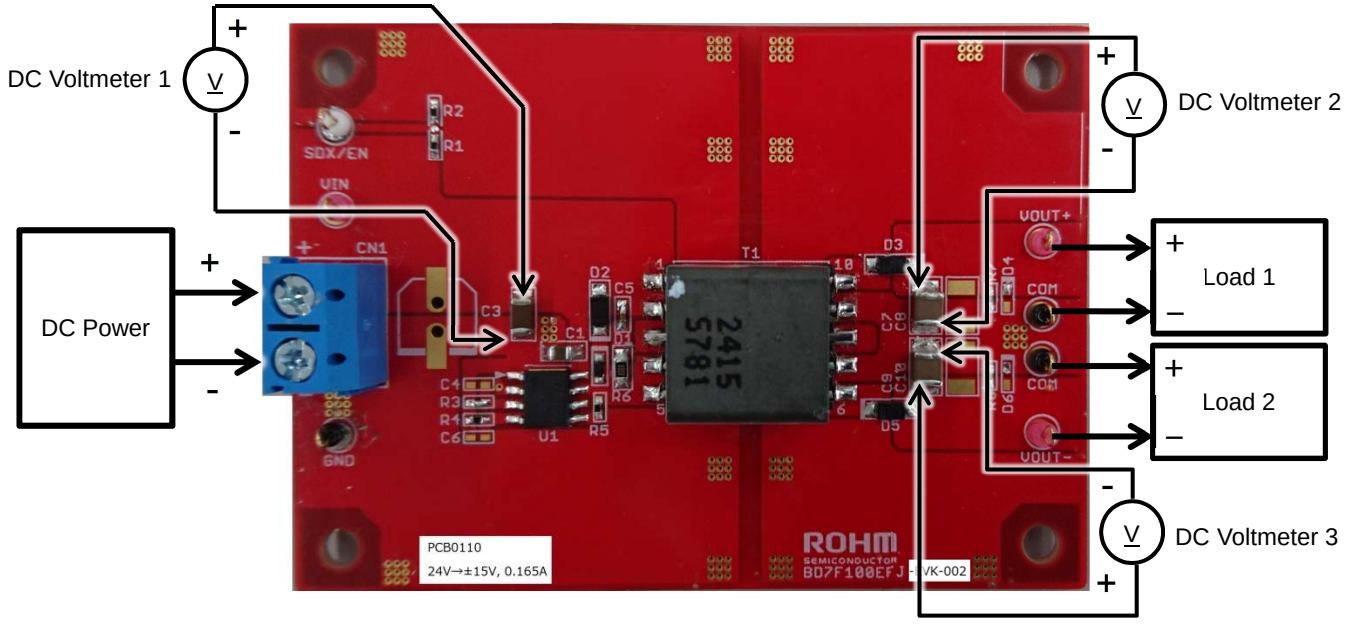

Figure 3. Connection Diagram

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Circuit Diagram

V_{IN} = 24V, V_{OUT1} = 15V, V_{OUT2} = -15V

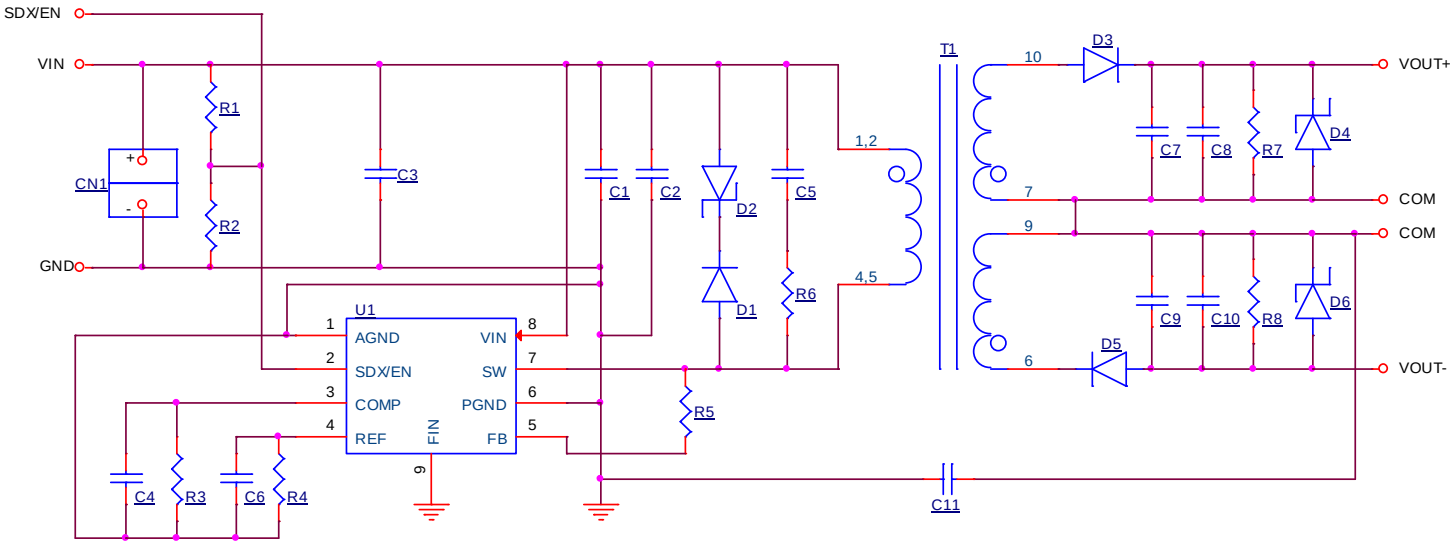

Figure 4. BD7F100EFJ-EVK-002 Circuit Diagram

Bill of Materials

No.	Value	Description	Size	Part Number / Series	Manufactuer
C1	1µF	Capacitor, Chip, 50V, X7R	2012	GRM21BR71H105KA12	MURATA
C2	4.7µF	Capacitor, Chip, 50V, X7R	3216	GRM31CR71H475KA12	MURATA
C3	-	Notinstalled	-	-	-
C4	-	Notinstalled	-	-	-
C5	4700pF	Capacitor, Chip, 50V, R	1005	GRM155R11H472KA01	MURATA
C6	-	Notinstalled	-	-	-
C7	10µF	Capacitor, Chip, 25V, X7R	3225	GRM32DR71E106KA12	MURATA
C8	-	Notinstalled	-	-	-
C9	10µF	Capacitor, Chip, 25V, X7R	3225	GRM32DR71E106KA12	MURATA
C10	-	Notinstalled	-	-	-
C11	-	Notinstalled	-	-	-
D1	1SS400SM	Diode	1608	1SS400SM	ROHM
D2	KDZ18B	Diode, Zener	3516	KDZ18B	ROHM
D3	RB160MM-90	Diode, Schottky	3516	RB160MM-90	ROHM
D4	-	Notinstalled	-	-	-
D5	RB160MM-90	Diode, Schottky	3516	RB160MM-90	ROHM
D6	-	Notinstalled	-	-	-
R1	1MΩ	Resistor, Chip, 1/16W, 1%	1005	MCR01MZPF1004	ROHM
R2	120kΩ	Resistor, Chip, 1/16W, 1%	1005	MCR01MZPF1203	ROHM
R3	-	Short	-	-	-
R4	3.9kΩ	Resistor, Chip, 1/16W, 1%	1005	MCR01MZPF3901	ROHM
R5	76.8kΩ	Resistor, Chip, 1/16W, 1%	1005	MCR01MZPF7682	ROHM
R6	1kΩ	Resistor, Chip, 1/8W, 1%	2012	MCR10EZPF1001	ROHM
R7	4.7 kΩ	Resistor, Chip, 1/16W, 1%	1005	MCR01MZPF4701	ROHM
R8	4.7 kΩ	Resistor, Chip, 1/16W, 1%	1005	MCR01MZPF4701	ROHM
T1	50µH	Transformer, Np:Ns1:Ns2=1:1:1, ±20%	13.5 x 20.0 x 12.5mm	CEP1311D-2415052R	sumida
U1	BD7F100EFJ	I.C. BD7F100EFJ	HTSOP-J8	BD7F100EFJ	ROHM

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Layout

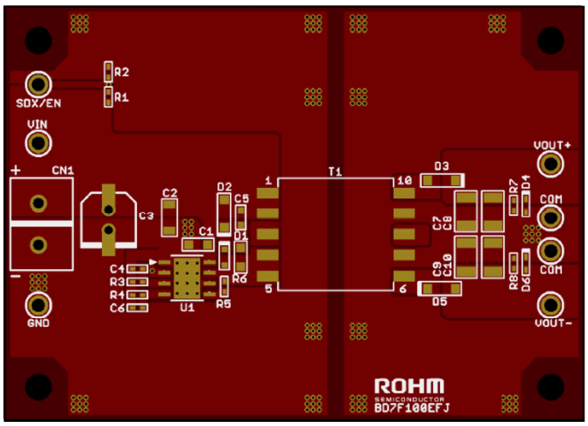

Figure 5. Top Silk Screen and Layout

(Top View)

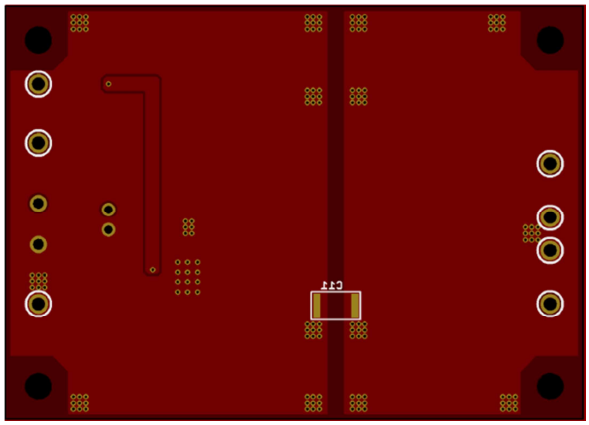

Figure 6 . Bottom Silk Screen and Layout

(Top View)

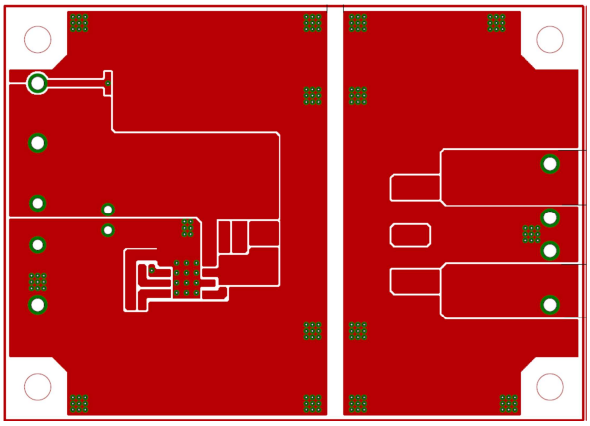

Figure 7. Top Side Layout

(Top View)

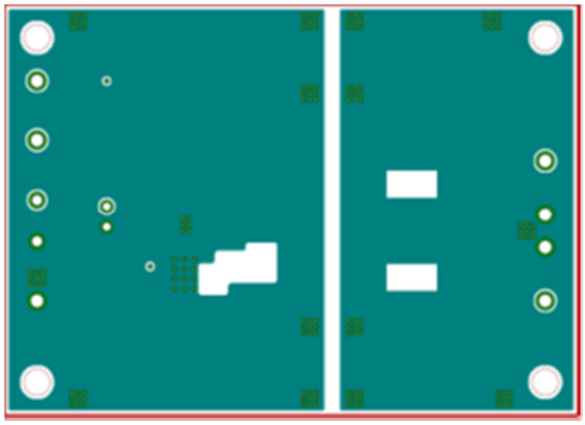

Figure 8. Middle Layer1 Layout

(Top View)

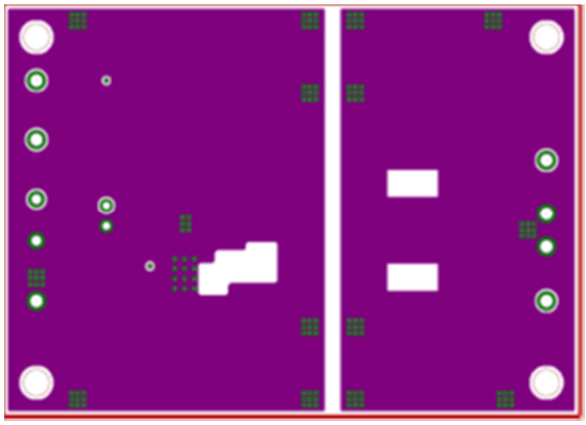

Figure 9. Middle Layer2 Layout

(Top View)

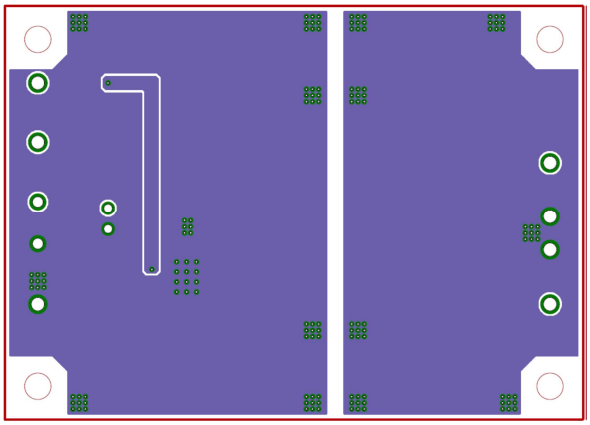

Figure 10. Bottom Side Layer Layout

(Top View)

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Reference Application Data

V_{IN} = 24V, V_{OUT1} = 15V, V_{OUT2} = -15V

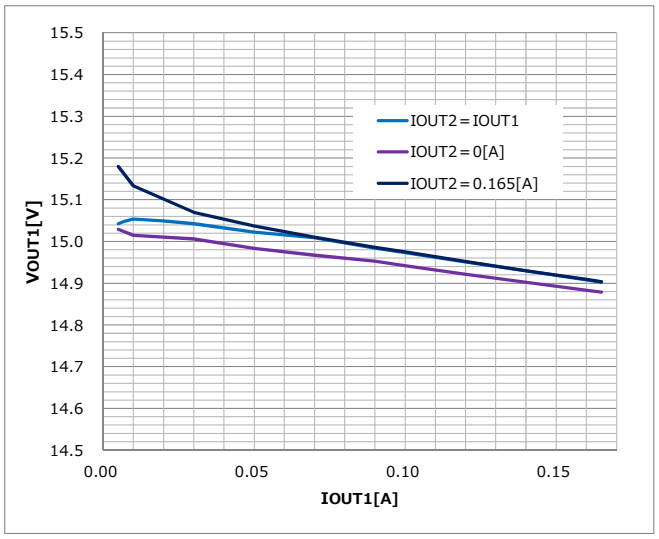

Figure 11. Load Regulation (V_{OUT1})

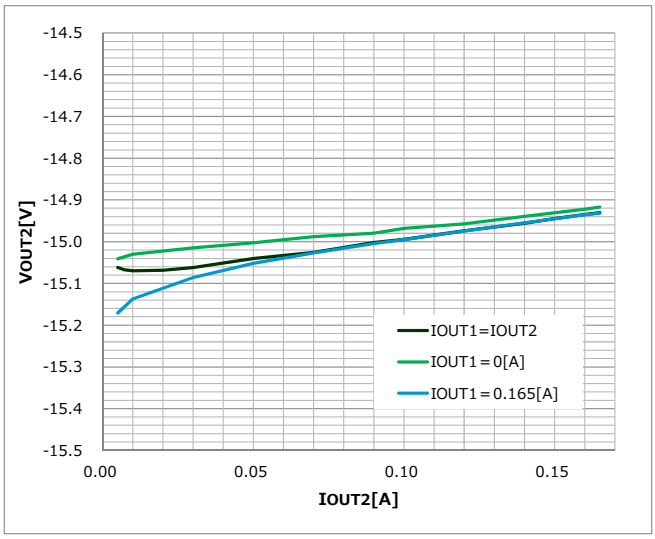

Figure 12. Load Regulation (V_{OUT2})

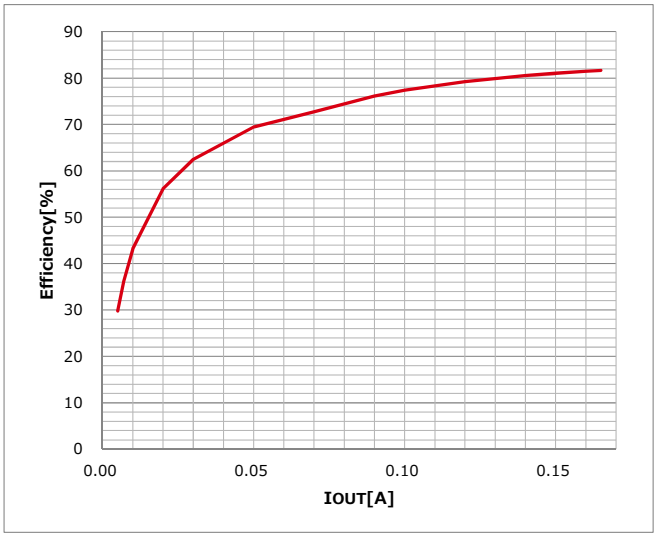

Figure 13. Efficiency vs Load Current

(I_{OUT}=I_{OUT1} = I_{OUT2})

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