Fairchild Reference Design RD-440

The following reference design supports inclusion of FSFR2100 in design of an auxiliary power supply. It should be used in conjunction with the FSFR2100 datasheet as well as Fairchild's application notes and technical support team. Please visit Fairchild's website at http://www.fairchildsemi.com.

Application	Fairchild Device	Input Voltage Range	Rated Output Power	Output Voltage (Rated Current)	Topology
Auxiliary Power	FSFR2100	185-265 V_{AC}	264 W	33 V (8 A)	Half-Bridge Resonant

Key Features

- Variable Frequency Control with 50% Duty Cycle for Half-Bridge Resonant Converter Topology
- High Efficiency through Zero Voltage Switching (ZVS)
- Internal SuperFET®s with Fast-Recovery Type Body Diode (trr=120 ns)
- Fixed Dead Time (350 ns) Optimized for MOSFETs
- Up to 300 kHz Operating Frequency
- Pulse Skipping for Frequency Limit (Programmable) at Light-Load Condition
- Remote On/Off Control Using Control Pin
- Protection Functions: Over-Voltage Protection (OVP), Over-Load Protection (OLP), Over-Current Protection (OCP), Abnormal Over-Current Protection (AOCP), Internal Thermal Shutdown (TSD)

1. Schematic

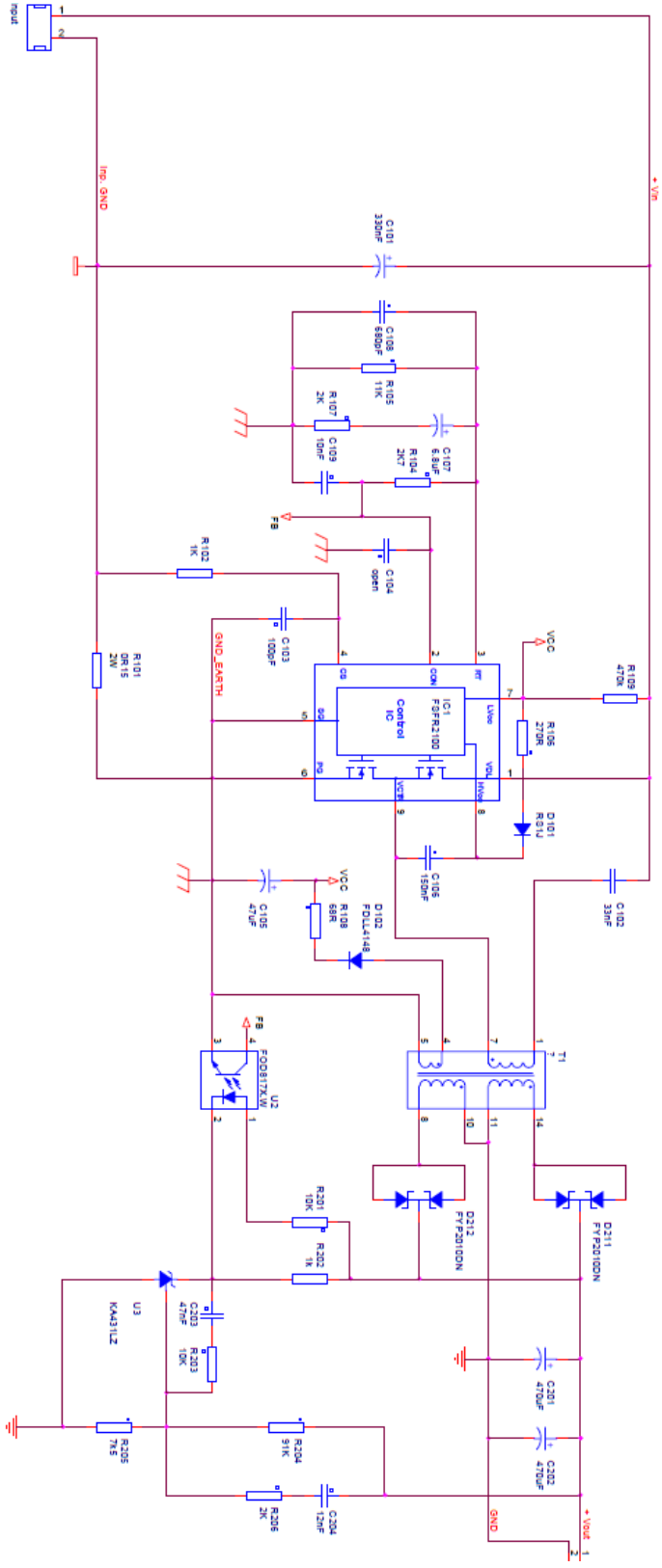

Figure 1. Schematic

2. Transformer

2.1. Transformer Schematic Diagram

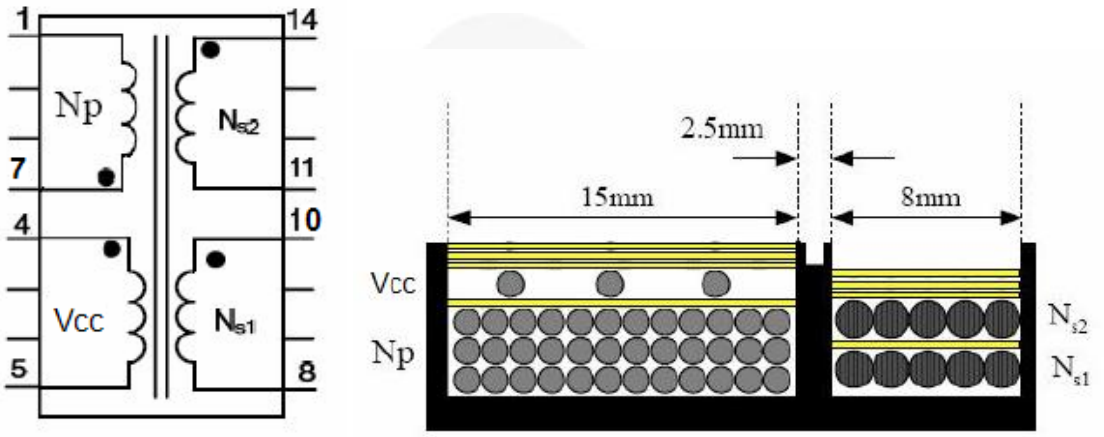

Figure 2. Transformer Configuration and Winding Stackup

2.2. Winding Specification

Windings	Pins (S→F)	Strands x Wire ø	Turns	Layers	Winding Method
Primary	7→1	30 x 0.12 mm	36	3	Solenoid
V_{CC}	4→5	1 x 0.224 mm	3	1	Spaced
Sec_1	14→11	90 x 0.1 mm	6	1	Solenoid
Sec_2	10→8	90 x 0.1 mm	6	1	Solenoid

Core: EER3542 (Ae = 107mm^2)
Bobbin: EER3542 Horizontal / 14 pins

2.3. Electrical Characteristics

	Pin	Specification	Remark
Inductance	7→1	640 µH ±5%	100 kHz, 100 mV
Leakage	7→1	110 µH ±-5%	Short all secondaries

3. Bill of Materials

Part	Value	Qty.	Note
R101	0.15	1	2W
R102	1 k	1	1/4W
R104	2.7 k	1	1/4W
R105	11 k	1	1/4W
R106	270	1	1/4W
R107	2 k	1	1/4W
R108	68	1	1/4W
R109	470	1	1/4W
R201	10 k	1	1/4W
R202	1 k	1	1/4W
R203	10 k	1	1/4W
R204	91 k	1	1/4W
R205	7.5 k	1	1/4W
R206	2 k	1	1/4W
C101	330 nF	1	Film
C102	33 nF	1	Film
C103	100 pF	1	Ceramic
C104	n.c		
C105	47 µF	1	Electrolytic
C106	150 nF	1	Ceramic
C107	6.8 µF	1	Electrolytic
C108	680 pF	1	Ceramic
C109	10 nF	1	Ceramic
C201	470 µF	1	Electrolytic
C202	470 µF	1	Electrolytic
C203	47 nF	1	Ceramic
C204	12 nF	1	Ceramic
D101	RS1J	1	
D102	FDLL4148	1	
D211	FYP2010DN	1	
D212	FYP2010DN	1	
T1	See Specs Above		
IC1	FSFR2100	1	FPS
U2	FOD81X.W	1	Opto-Coupler
U3	KA431LZ	1	Voltage-Reference
F101	3.15 A / 250 V	1	

4. Related Resources

FSFR2100– Product Folder

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