Reference Design RD-333

Fairchild Power Switch (FPS™) FSQ0365RN – 18.1W Design

Featured Device	Application	Input Voltage Range	Output Voltage (Rated Current)	Rated Output Power	Topology
FSQ0365RN	STB, DVD Player	85~265V_{AC}	5.1V (1A) 3.4V (1A) 12V (0.4A) 16V (0.3A)	18.1W	Flyback Converter

Key Features

- Optimized for Quasi-Resonant Converter (QRC)
- Low EMI through Variable Frequency Control and Inherent Frequency Modulation
- High Efficiency through Minimum Voltage Switching
- Narrow Frequency Variation Range Over Wide Load and Input Voltage Variation
- Advanced Burst-Mode Operation for Low Standby Power Consumption
- Various Protection functions: Overload Protection (OLP), Over Voltage Protection (OVP), Abnormal Over Current Protection (AOCP), and Internal Thermal Shutdown (TSD)
- Under-Voltage Lockout (UVLO) with Hysteresis
- Internal Startup Circuit and Built-in Soft-Start: 15ms
- Internal High Voltage SenseFET: 650V

1. Schematic

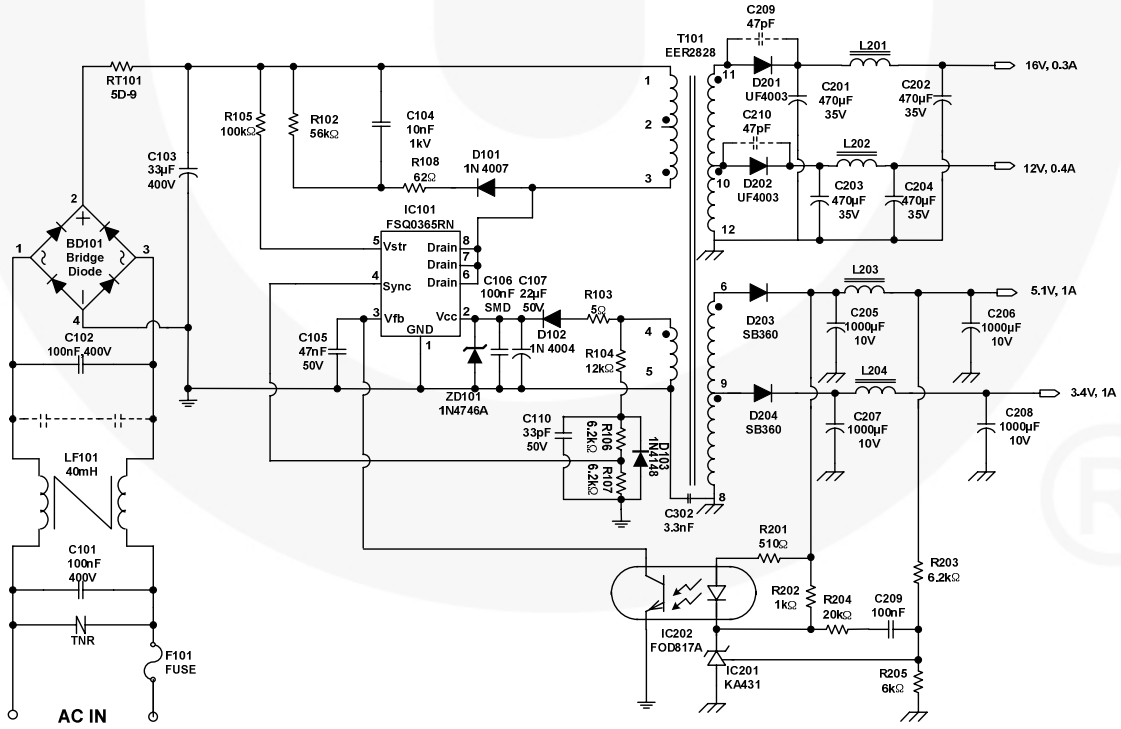

Figure 1. Schematic

2. Transformer

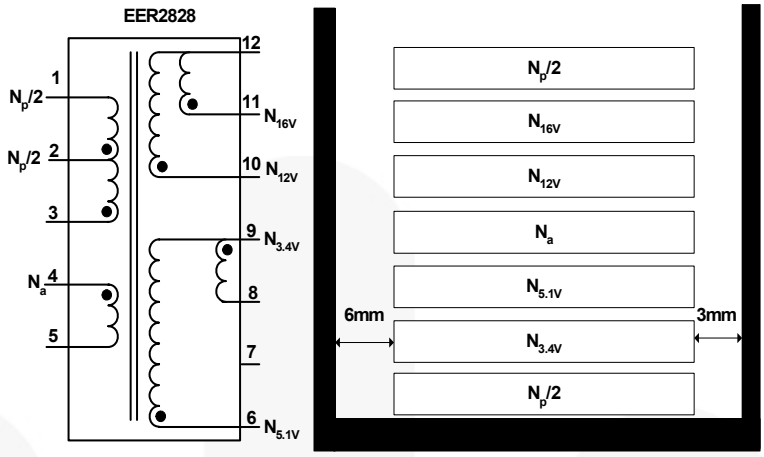

Figure 2. Transformer Schematic Diagram

2.1. Winding Specification

	Pin (S → F)	Wire	Turns	Winding Method
$N_p/2$	3 → 2	0.25φ×1	50	Center Solenoid Winding
Insulation: Polyester Tape t = 0.050mm, 2 Layer				
$N_{3.4V}$	9 → 8	0.33φ×2	4	Center Solenoid Winding
Insulation: Polyester Tape t = 0.050mm, 2 Layer				
N_{5V}	6 → 9	0.33φ×1	2	Center Solenoid Winding
Insulation: Polyester Tape t = 0.050mm, 2 Layer				
N_a	4 → 5	0.25φ×1	16	Center Solenoid Winding
Insulation: Polyester Tape t = 0.050mm, 2 Layer				
N_{12V}	10 → 12	0.33φ×1	14	Center Solenoid Winding
Insulation: Polyester Tape t = 0.050mm, 3 Layer				
N_{16V}	11 → 12	0.33φ×1	18	Center Solenoid Winding
Insulation: Polyester Tape t = 0.050mm, 2 Layer				
$N_p/2$	2→ 1	0.25φ×1	50	Center Solenoid Winding
Insulation: Polyester Tape t = 0.050mm, 2 Layer				

Core: EER2828
Bobbin: EER2828

2.2. Electrical Characteristics

	Pin	Specification	Remark
Primary-Side Inductance	1 – 3	1.4mH ± 5%	100kHz, 1V, All Other Pins Open
Primary-Side Leakage Inductance	1 – 3	25μH Max.	100kHz, 1V, All Other Pins Shorted

3. Related Resources

FSQ0365RN — Green-Mode Fairchild Power Switch FPS™ for Valley Switching Converter

AN-4150 — Design Guidelines for Flyback Converters Using FSQ-Series Fairchild Power Switches (FPS™)