

## Reference Design RD-351

### Dual Switch Flyback Solution – 120W/12V Design

Featured Device	Application	Input Voltage Range	Output Voltage (Rated Current)	Rated Output Power	Topology
FAN6920MR FAN7382 FAN6204	SMPS AIO PC Power	90~264V <sub>AC</sub>	12V/10.0A	120W	Dual Switch Flyback

Featured Fairchild Product: FAN6920MR, FAN7382, FAN6204

- Ultra-Low Standby Power: Under 0.2W @ 230V<sub>AC</sub> meet with 2013 ErP requirement
- Zero-Current Detection for PFC Stage
- Quasi-Resonant Operation for PWM Stage with 5ms Soft-start
- High-Voltage Startup
- Protection Functions ( V<sub>DD</sub> OVP/UVLO, OCP, OLP, Line voltage sensing and OTP)
- Secondary Synchronous Rectifier with CCM/DCM operation
- No need standby power stage

## 1. Schematic

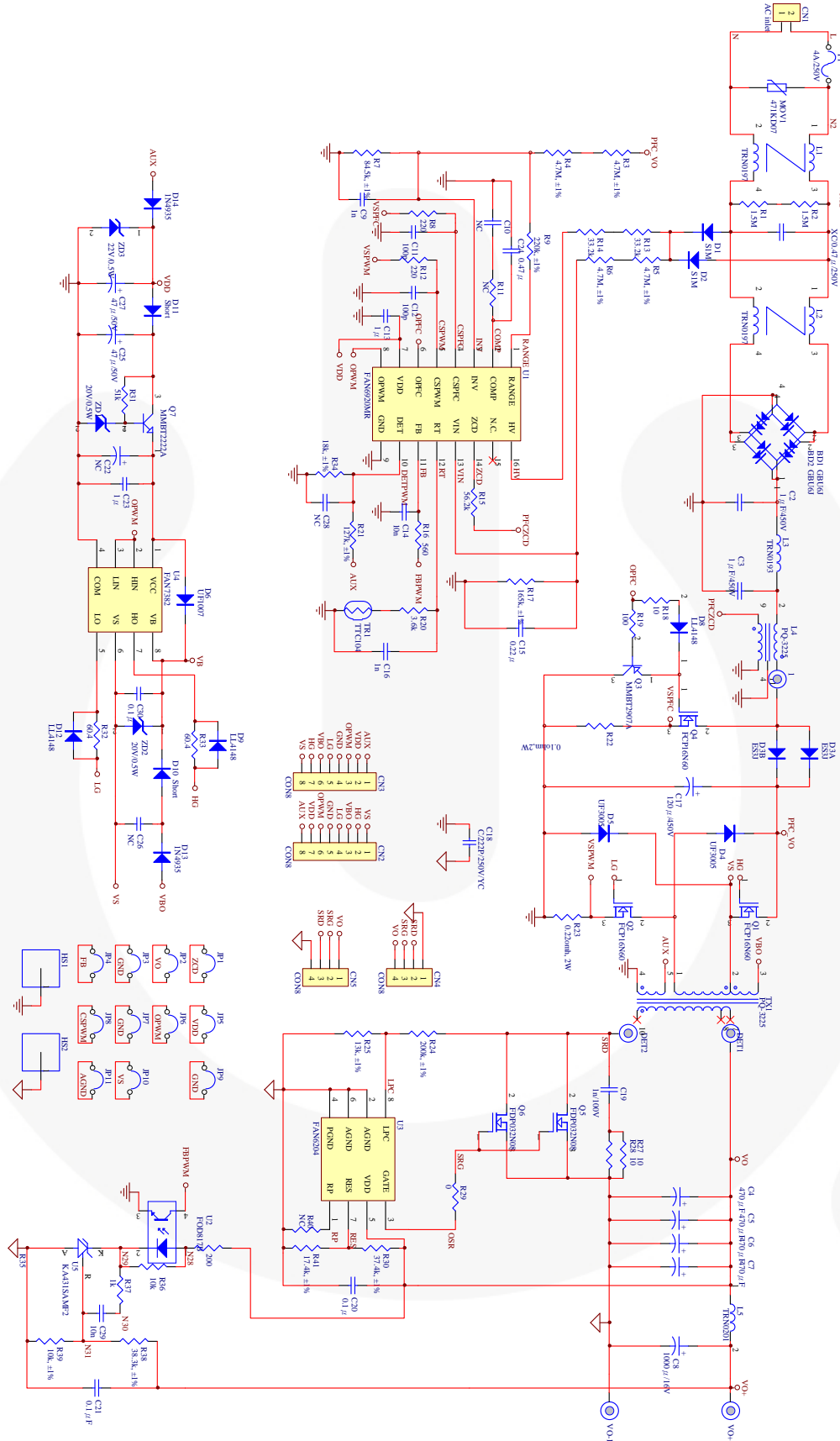


Figure 1. Dual Switch Flyback 120W Application Schematic

## 2. Transformer

### 2.1. Transformer Schematic Diagram

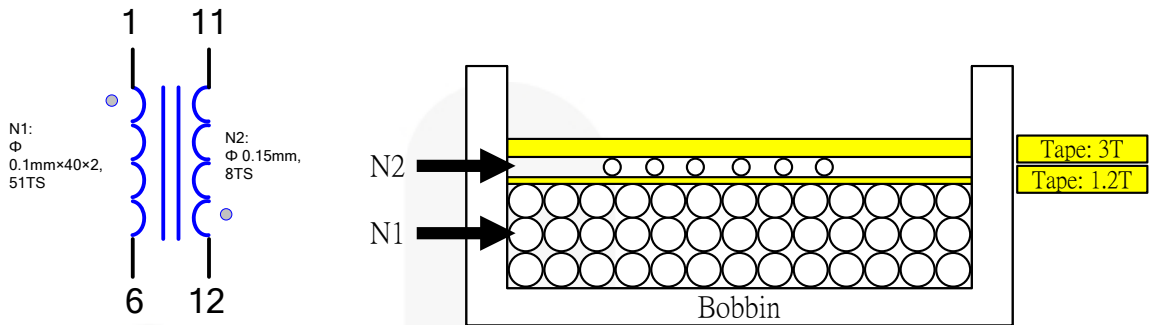


Figure 2. PFC Choke

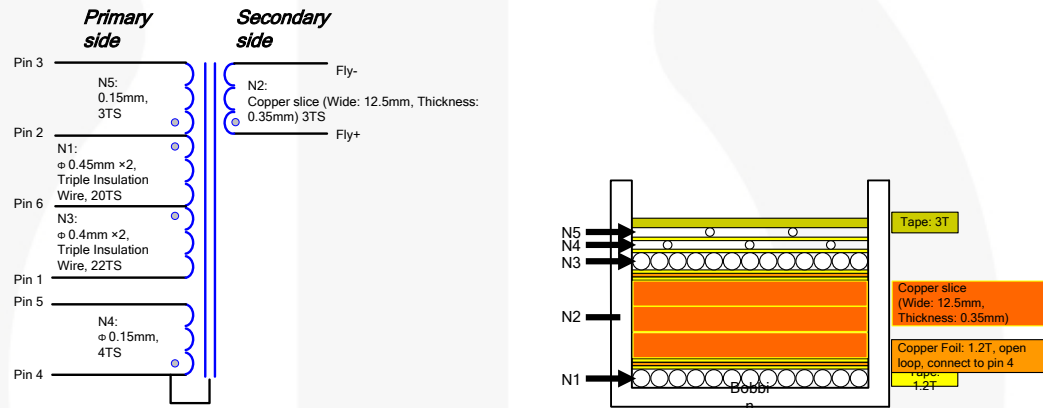


Figure 3. Main power

## 2.2. Winding Specification

	Pin(S → F)	Wire	Turns	Isolation Tape	Winding Method
<b>PFC Choke</b>					
N1	1 → 6	0.1φ x 40 x 2	51	1.2	
N2	12 → 11	0.15φ	8	3	Space Winding
<b>Main Transformer</b>					
	Pin(S → F)	Wire	Turns	Isolation Tape	Winding Method
N1	2 → 6	0.45φ x 2 Triple insulation wire	20	1.2	
Shielding	4	Copper Foil	1.2 open	1.2	
N2	Fly+ → Fly-	Copper Slice 12.5 W x0.35 H		1.2	
	Fly+ → Fly-	Copper Slice 12.5 W x0.35 H		1.2	
	Fly+ → Fly-	Copper Slice 12.5 W x0.35 H		1.2	
Shielding	4	Copper Foil	1.2 open	1.2	
N3	6 → 1	0.4φ x 2 Triple insulation wire	22	1.2	
N4	4 → 5	0.15φ	4	1.2	Space Winding
N5	2 → 3	0.15φ	3	1.2	Space Winding

### Notes:

#### PFC Choke

Core: 3C96

Bobbin: QP-3225

#### Main Transformer

Core: 3C96

Bobbin: QP-3225

## 2.3. Electrical Characteristics

PFC Choke	Pin	Spec.	Remark
Primary-Side Inductance	1 - 6	440μH ±5%	100kHz, 1V
Main Transformer	Pin	Spec.	Remark
Primary-Side Inductance	1 - 2	790μH ±5%	100kHz, 1V

## 3. Typical Performance

### 3.1. Power Consumption

Output Watt.		Actual Output Watt.	Input Watt.	Spec.
No load	115Vac		0.149	Input Watt <0.3W
	230Vac		0.168	
0.25W	115Vac	0.263	0.466	Input Watt <0.5W
	230Vac	0.264	0.482	
0.5W	115Vac	0.499	0.754	Input Watt <1W
	230Vac	0.499	0.756	
1W	115Vac	1.003	1.355	Input Watt <1.7W
	230Vac	1.002	1.348	
1.15W	115Vac	1.150	1.526	Input Watt <2.16W
	230Vac	1.147	1.518	
1.5W	115Vac	1.507	1.944	Input Watt <2.4W
	230Vac	1.506	1.942	
1.7W	115Vac	1.705	2.175	Input Watt <2.4W
	230Vac	1.701	2.136	

### 3.2. Efficiency

Output Watt	22.5W	45W	67.5W	90W	Avg.	Spec.
115V/60Hz	90.68%	92.18%	92.45%	92.10%	91.85%	Avg. > 87%
230V/50Hz	92.19%	91.80%	92.76%	92.95%	92.43%	

## Related Resources

[FAN6920MR — Integrated Critical Mode PFC and Quasi-Resonant Current Mode PWM Controller](#)  
[FAN7382 — Half Bridge Gate driver](#)  
[FAN6204 — Secondary Synchronous Rectifier Controller for Flyback Topology and Forward Freewheeling Rectification](#)

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