

## Fixed Frequency Switch Mode Power Supply Using FA5311BP

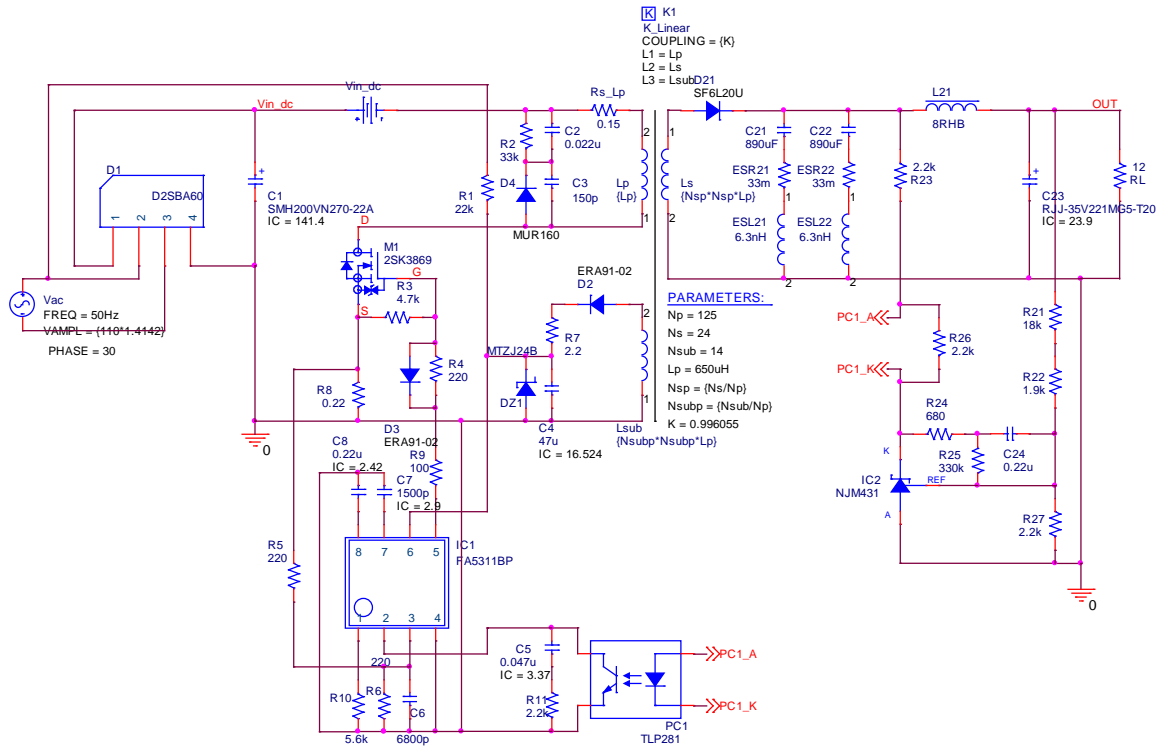


Table of component models used in the DesignKit

Code	Classification	Part No.	Manufacturer	SPEC
IC1	Pulse Width Modulation Control IC	FA5311BP	Fuji Electric	
IC2	Shunt Regulator	NJM431	JRC	37V/0.15A, $V_{CE0REF}=2.495$
PC1	Photocoupler	TLP281	TOSHIBA	
M1	MOSFET	2SK3869	TOSHIBA	450V/10A
D1	Bridge Rectifier Diode	D2SBA60	SHINDENGEN	600V/1.5A
D2 ,D3	Diode	ERA91-02	Fuji Electric	200V/0.5A
D4	Diode	MUR160	MOTOROLA	600V/1A
D21	Diode	SF6L20U	SHINDENGEN	200V/6A
DZ1	Zener Diode	MTZJ24B	ROHM	
L21	Choke Coil	8RHB	TOKO	10uH ,2.3A
C1	Aluminum Electrolytic Capacitor	SMH200VN270-22A	Nippon Chemi-Con	270uF ,200V
C23	Aluminum Electrolytic Capacitor	RJJ-35V221MG5-T20	ELNA	220uF ,35V

Simulation files are stored in folders, as shown in list below.

<b>Simulations</b>	<b>Folder name</b>
1. Start-Up Transient simulation.....	TRANS
2. Steady-State Simulation.....	STEADY
3. Transformer Leakage Inductance $L_{leak}$ .....	LEAK
4. RCD Clamping Network.....	CLAMP

※ Please copy the folder named “Simulations” to your PC. Library files (.lib) are added already.

Design document: **Fixed Frequency Switch Mode Power Supply Using FA5311BP**

### Contents

1. Background
    - 1.1 Flyback Converter
    - 1.2 Current Waveforms
    - 1.3 Equations
  2. Specification
    - 2.1 Output Voltage
    - 2.2 Output Current
    - 2.3 Steady State Initial Conditions
    - 2.4 Output Ripple Voltage
    - 2.5 Efficiency
  3. Design Consideration
    - 3.1 DC Link Voltage  $V_{DC,IN}$
    - 3.2 Reflected Voltage  $V_{RO}$
    - 3.3 Transformer Primary Side Inductance  $L_P$
    - 3.4 Transformer Turn Ratio
    - 3.5 Transformer Leakage Inductance  $L_{leak}$
    - 3.6 RCD Clamping Network
  4. MOSFET Switching Device  $M_1$ 
    - 4.1  $M_1$  Voltage and Current Stresses
    - 4.2 Losses in  $M_1$
    - 4.3 MOSFET Model
  5. Output Rectifier Diode  $D_{21}$ 
    - 5.1  $D_{21}$  Voltage and Current Stresses
    - 5.2 Losses in  $D_{21}$
  6. Output Capacitor  $C_{21}$  and  $C_{22}$
  7. Photocoupler  $PC_1$
- Simulation Index