PFC-Flyback Transformer design

1.spec.

Vac.min=	**90**	V
Vac.max=	**264**	V
fL=	50	Hz
Vout=	**32**	V
Iout=	**0.65**	A
Dvout=	1	V

2.Predesign selection

fsw.min=	**38**	kHz
VR=	**126.7**	V
Vsurge=	100	V
eff.=	0.75	

3.Initial caculation

Vpk.min=	123.3	V %=1.41*Vac.min-4
Vpk.max=	373.4	V
Pout.max=	20.8	W
Pin=	27.7	W
Kv=	**0.97**	**% Kv=Vpk.min/VR**
F1(Kv)=	0.375	% F1(x)=[0.637+4.6*e-3*x]/[1+0.729x]
F2(Kv)=	0.280	% F2(x)=[0.5+1.4*e-3*x]/[1+0.815x]
F3(Kv)=	0.231	% F3(x)=[0.424+5.7*e-4*x]/[1+0.862x]

4. opr. Condition

Ipkp=	**1.61**	A % Ipkp=2Pin/[Vpk.min*F2(Kv)]
Irms.p=	**0.49**	A % Irms.p=Ipkp*root[F2(Kv)/3]
Ipks=	**4.78**	A % Ipks=2Iout/[Kv*F2(Kv)]
Irms.s=	**1.31**	A % Irms.s=Ipks*root[Kv*F3(Kv)/3]

5. Transformer

Lp=	**1.02**	mH % Lp=Vpk.min/[(1+Kv)*fsw.min*Ipkp]
N=Np/Ns=	**3.9**	% =VR/(Vout+Vfwd)
Bs=	400	mT@100C, PC40
Ae=	40	mm2
DB=0.8Bs=	320	mT
Np.min=	**128.5**	Ts % Np.min=Lp*Ipkp/(Ae*DB)
Np=	**128**	Ts
Lg=	**0.81**	mm % Lg=4*pi*e-7*Ae*Np^2/Lp
Ns=	**33.1**	Ts % Ns=Np/N

6. Cout

Cout=	**1799**	uF % Cout=H2(Kv)*Iout/[pi*fL*F2(Kv)*DV]
& H2(Kv)=	0.12	% H2(x)=(0.25-1.5x/1000)/(1+1.074x)

7.MOSFET

Vds.max=	**600.1**	V %=Vpk.max+VR+Vsurge

[END]