

myPower online Design Center

Featuring the IR1150 μ PFC

<http://mypower.irf.com/pfc>

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Home page & login:

POWER TO LEAD

Welcome to MyPower, International Rectifier's premier site for power design.



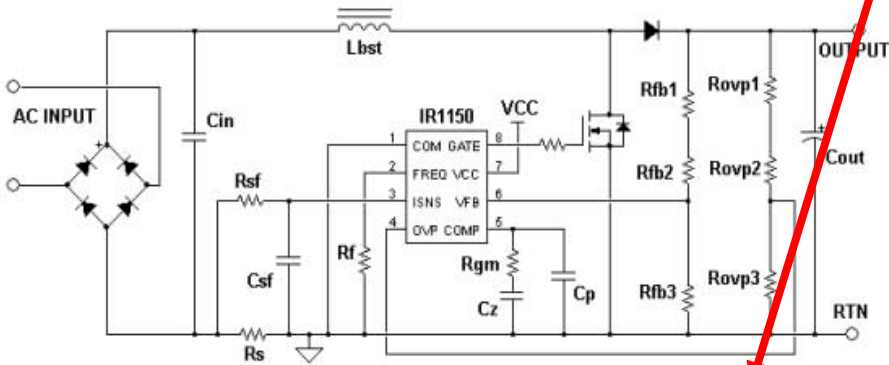
Access the design center and use the tools to create and optimize your design.

New to myPOWER?
Registration is fast, FREE, & easy.

New Feature: One Cycle control μ PFC circuit design featuring the IR1150S IC

See all the details in a downloadable guided tour (1.2MB, updated July 2005).

Calculate Values of all components in the Control Circuit



Cut PFC control board space in Half!



Component	Ref Des	Std Value	Calc Value
High Freq Input Cap	Cin	330 nF	0.24 μ F
Boost Choke Value	Lbst	820 μ H	762 μ H
Output Capacitor	Cout	330 μ F	224 μ F
Output Voltage Rset	Rfb3	18.7 kOhm	18.5 kOhm
Output OVP Rset	Rovp3	17.8 kOhm	17.6 kOhm
Current Sense Res	Rs		0.121 Ohm
Zero Capacitor	Cz	330 nF	331 nF
Gain Resistor	Rgm	6.65 kOhm	6.63 kOhm
Pole Capacitor	Cp	1.5 nF	1.44 nF
Current Sense Filter Capacitor	Csf	1 nF	1.00 nF
Current Sense Filter Resistor	Rsf	1 kOhm	1.00 kOhm
Timing Resistor	Rf	80.6 kOhm	80.1 kOhm

Rfb1, Rfb2, Rovp1 and Rovp2 are 499 kOhms each

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IR1150 Operating Conditions:

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Step 1: Enter Operating Conditions

Input		Output	
Min Input Voltage: 85 V ?	Switching Frequency: 100 kHz ?	Output Power: 300 W ?	
Max Input Voltage: 264 V ?	Hold-up Time: 20 ms ?	Output Voltage: 385 V ?	
Input AC Frequency: 60 ?	Choke Ripple Current: 20 % ?	Output Voltage (min): 286 V ?	
Start-up Time: 50 ms ?		Output Cap Tolerance: 20 % ?	
Target Efficiency: 92 % ?		OVP Threshold: 425 V ?	

Step 2:

CALCULATE

ANALYZE

Other Options:

RESET **HELP** **LIST** **SAVE DESIGN** **DATASHEET**

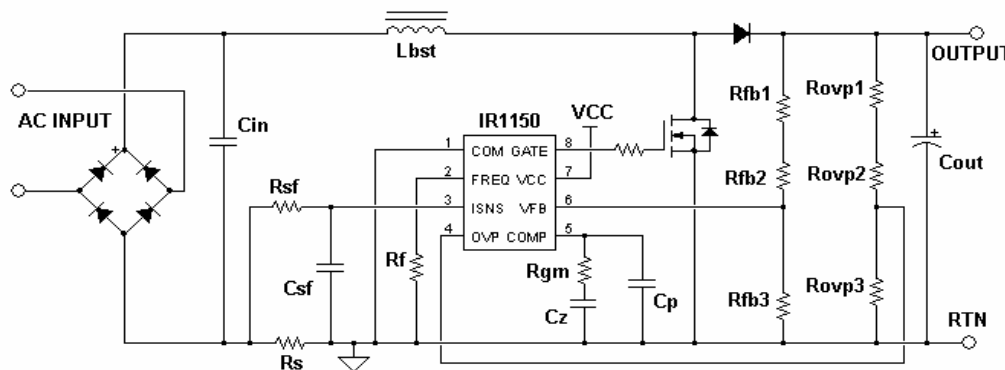
- Enter Input & Output Operating Conditions
- Click on CALCULATE
- See results Here
- ANALYZE / PDF report gives details of the design!

Step 3: Check Calculation Result.

Electrical Calculations:		Component Values:			
		Component	Ref Des	Std Value	Calc Value
Max Input Power	326 W	High Freq Input Cap	Cin	330 nF	0.24 uF
Input RMS Current	3.84 A	Boost Choke Value	Lbst	820 uH	762 uH
Input Peak Current	5.43 A	Output Capacitor	Cout	330 uF	226 uF
Input Average Current	3.45 A	Output Voltage Rset	Rfb3	18.7 kOhm	18.5 kOhm
Input Pk Voltage (min)	120 V	Output OVP Rset	Rovp3	18.2 kOhm	17.9 kOhm
Duty Cycle - low line	0.69	Current Sense Res	Rs		0.121 Ohm
Ripple Current	1.09 A	Zero Capacitor	Cz	330 nF	331 nF
Peak Inductor Current	5.97 A	Gain Resistor	Rgm	5.36 kOhm	5.35 kOhm
V Current Sense	0.76 V	Pole Capacitor	Cp	1.8 nF	1.78 nF
Peak Current Limit	8.29 A	Current Sense Filter Capacitor	Csf	1 nF	1.00 nF
Input Pk Ovld Current	6.27 A	Current Sense Filter Resistor	Rsf	100 Ohm	100 Ohm
Power Dissipation:		Timing Resistor	Rf	80.6 kOhm	80.1 kOhm
Power Dissipation Rfb	71.6 mW				
Power Diss Rovp	71.4 mW				
Power Rs	1.77 W				

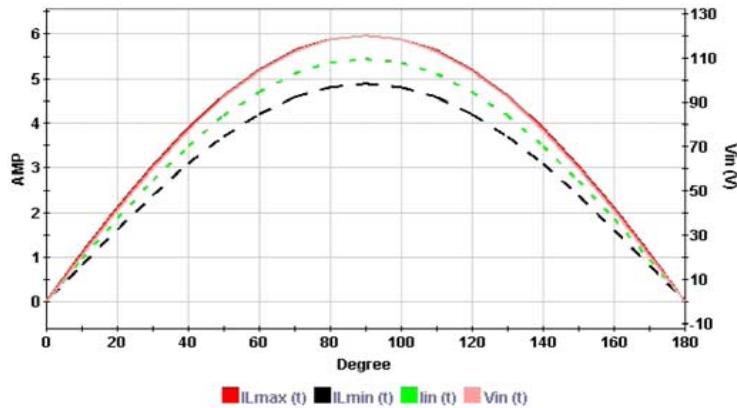
Online tool range:

- 70-264 VAC input
- 50, 60 & 400 Hertz
- 5-200 mS start up time
- 75-99% efficiency
- 50-200kHz Switching Freq.
- 10-50 mS hold up time
- 10-50% choke ripple current
- 75-4kW output power
- 200-450 VDC output
- 10-50% Cout tolerance
- 215-500 VDC OVP

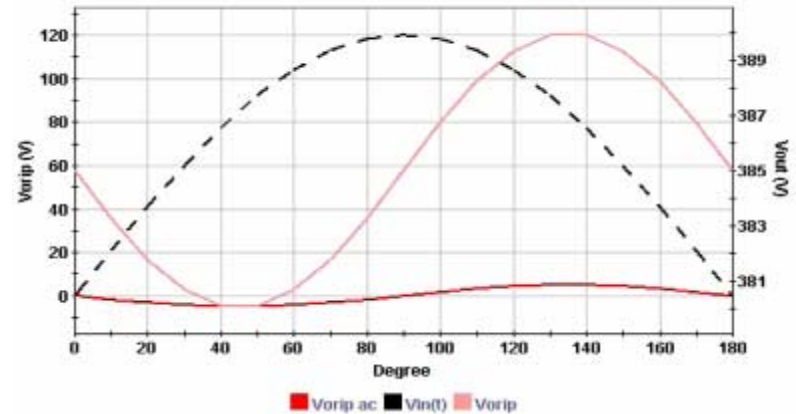


PDF report shows waveforms and response characteristics

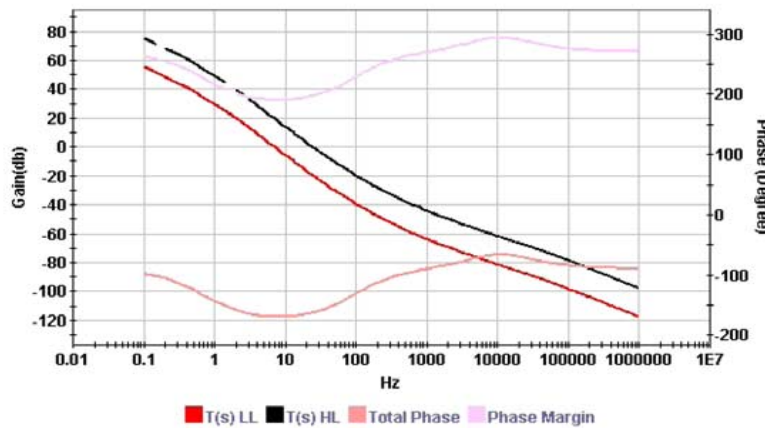
Input Voltage and Current



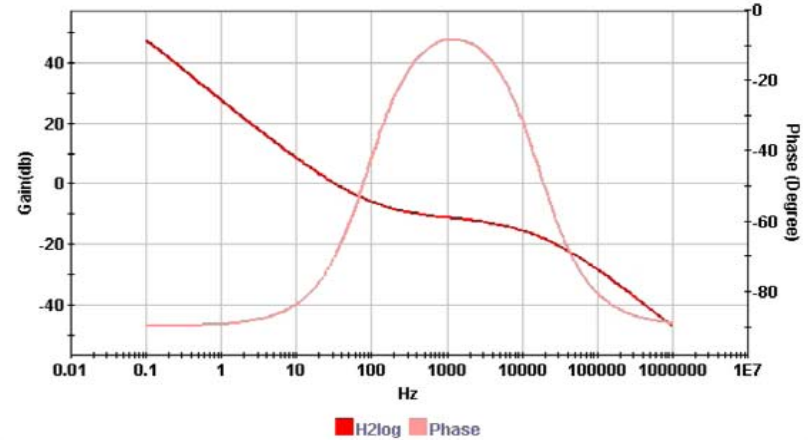
Output Ripple Voltage



Overall Loop Response



H2(s) Error Amp Response



Why the limits?

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- The online design tool was intended for the most common applications.
- The math had to be accurate to the IRAC1150-300W reference design.
- To design a PFC beyond the limits of the online design tool, see Application note AN-1077 at <http://www.irf.com/technical-info/appnotes/an-1077.pdf>
- MOSFET, IGBT & boost diode recommendations are in the works, but the difficulty in matching the mathematical power loss models to the measured data is a very laborious task.

Send feedback to mypower@irf.com

<http://mypower.irf.com/pfc>