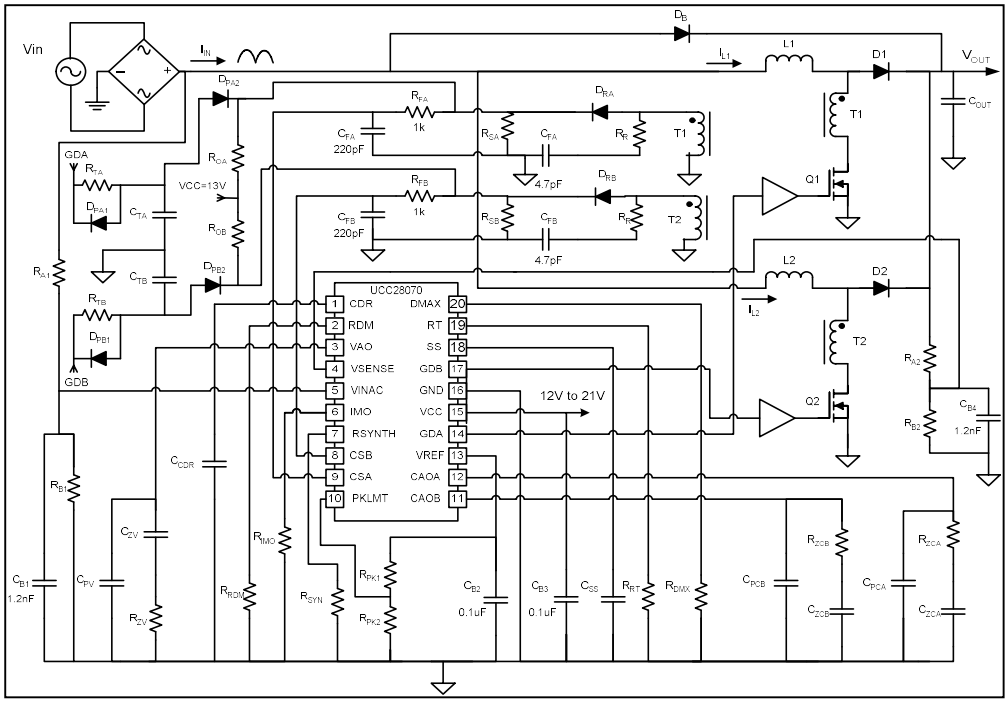
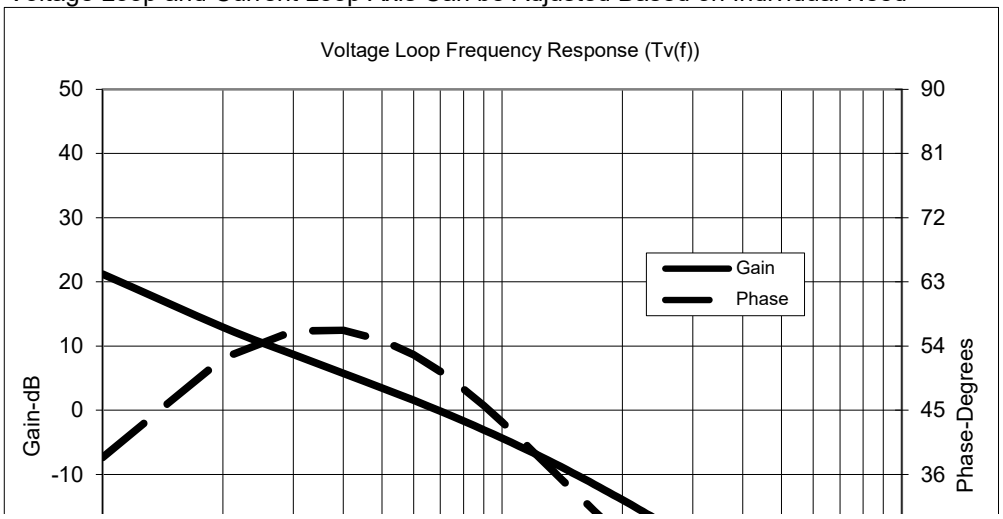
UCC28070 Controller Setup Tool	20/11/2018		
Preliminary			
Notes:			
This design tool is designed to work with the UCC28070 Application Note SLUA479			
This design tool is optimized for a Universal Input and can be used for designs were the input voltage is anywhere between 85V to 265V RMS.			
Please enter design parameters into the	**shaded**	**cells;**	
Calculated results will be in GRAY			
Design Parameters:	**Variable Names**		Units
Minimum RMS Input Voltage	V_{IN_MIN}	85	V
Maximum RMS Input Voltage	V_{IN_MAX}	265	V
Minimum Line Frequency	f_{LINE}	47	Hz
Maximum Line Frequency		63	Hz
Maximum Output Power	P_{OUT}	600	W
Full Load Efficiency (Must be less than 0.99)	η	0,97	
Switching Frequency	f_S	6,50E+04	Hz
Output Voltage	V_{OUT}	390	V
Maximum Duty Cycle	D_{MAX}	0,97	
Soft Start Time	t_{SS}	0,50	s
Optional Frequency Dither Magnitude (Total Δfs)	f_{DM}	3,00E+04	Hz
Optional Frequency Dither Rate	f_{DR}	1,00E+04	Hz
VCC	VCC	15	V
Component Selection, Trip Points and Calculated Values from the UCC28070 Design Example			
Duty Cycle at the Peak the Peak of Low Line Input	D_{PLL}	0,69	
Inductor Ripple Current Cancellation at the Peak of Low Line	$K(D_{PLL})$	0,55	
Inductor Ripple Current	ΔI_{L1}	5,57	
Calculated Boost Inductors L_{1_MIN}, L_{2_MIN}	L_{1_MIN}, L_{2_MIN}	2,30E-04	H
Enter the Lowest Inductance Value of the Real Inductor	L_{1_MIN}, L_{2_MIN}	2,00E-04	H
Enter the Highest Inductance Value of the Real Inductor	L_{1_MAX}, L_{2_MAX}	3,50E-04	H
Average Inductance Value	L_{1_AVG}, L_{2_AVG}	2,75E-04	H
Inductor RMS Current	I_{L1_RMS}, I_{L2_RMS}	3,898	A
Output Capacitance Calculated Based on Holdup Time	C_{OUT}	3,84E-04	F
Output Capacitance Selected	C_{OUT}	4,70E-04	F
Output Ripple Voltage	V_{RIPPLE}	11,4	V
Low Frequency Output Capacitor RMS Current	I_{COUT_LF}	1,122	A
High Frequency Output Capacitor RMS Current	I_{COUT_HF}	3,079	A
Peak Diode and FET Current	I_{PEAK}	9,516	A
FET RMS Current (Q1 and Q2)	I_{DS}	3,127	A
Diode Average Current (D1 and D2)	I_D	0,769	A
Calculated Current Sense Transformer Turns Ratio	$N_{CT}=N_S/N_P$	95	
Enter Current Sense Transformer Turns Ratio	$N_{CT}=N_S/N_P$	100	

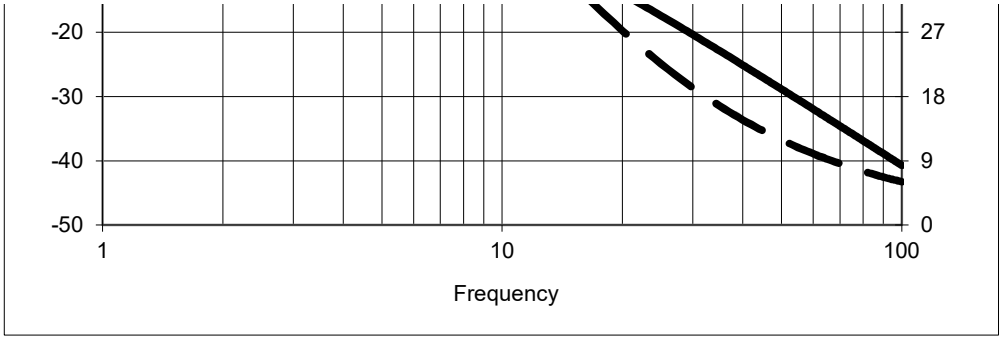
Minimum Magnetizing Inductance of the Current Sense Transform	L_M	2,07E-02	H
Select Current Sense Peak Voltage	V_S	3,70	V
Calculated Current Sense Resistor	$R_{SA} = R_{SB}$	35,0	ohm
Select Standard Current Sense Resistor	$R_{SA} = R_{SB}$	33	ohm
CalculatedReset Resistor	R_R	1,E+03	ohm
Select a Standard Value	R_R	1,00E+03	ohm
Calculated Maximum DR Reverse Voltage	V_R	95	V
Current Sense Offset Desired	V_{OFF}	0,20	V
Program Offset Bias Current to be added to R_S	$R_{OA}=R_{OB}$	2,44E+03	ohm
Select a Standard Value	$R_{OA}=R_{OB}$	2,20E+03	ohm
Program Current Sense PWM Ramp Resistor	$R_{TA}=R_{TB}$	3,00E+03	ohm
Select Standard Values	$R_{TA}=R_{TB}$	2,49E+03	ohm
Program Current Sense PWM Ramp Timing Capacitor	$C_{TA}=C_{TB}$	1,55E-07	F
Select Standard Values	$C_{TA}=C_{TB}$	4,70E-08	F
Select High Side Resistor on Peak Current Limit Divider	R_{PK1}	3,60E+03	ohm
Calculated Low Side Resistor on Peak Current Limit Divider	R_{PK2}	5,79E+03	ohm
Select Low Side Resistor on Peak Current Limit Divider	R_{PK2}	5,80E+03	ohm
Calculated Timing Resistor	R_{RT}	1,15E+05	ohm
Select Timing Resistor	R_{RT}	1,10E+05	ohm
Calculated Programmable Duty Cycle Limit Resistor	R_{DMX}	1,03E+05	ohm
Select Programmable Duty Cycle Limit Resistor	R_{DMX}	1,00E+05	ohm
Select High Side Resistor for VSENSE Voltage Divider	R_A	3,00E+06	ohm
Calculated Low Side Resistor on VSENSE voltage Divider	R_B	2,33E+04	ohm
Select Low Side Resistor on VSENSE voltage Divider	R_B	2,32E+04	ohm
Calculated Nominal Over Voltage Trip Point	V_{OVP}	414	V
Voltage Divider Gain	H	7,67E-03	
Voltage Amplifier Output Impedance at double f_{LINE}	Z_O	1,56E+04	ohm
Calculated Pole Capacitance for the Voltage Loop	C_{PV}	1,08E-07	F
Select a Standard Value	C_{PV}	1,50E-07	F
Calculated Voltage Loop Crossover Frequency	f_{VC}	9,8	Hz
Calculated Voltage Loop Zero Compensation Resistor	R_{ZV}	1,08E+05	ohm
Select a Standard Value	R_{ZV}	1,00E+05	ohm
Calculated Voltage Loop Zero Compensation Capacitor	C_{ZV}	1,62E-06	F
Select a Standard Value	C_{ZV}	1,50E-06	F
Calculated Current Synthesis Programmable Resistor	R_{SYN}	8,14E+04	ohm
Select a Standard Value	R_{SYN}	8,20E+04	ohm
Voltage Calculation for Selecting Multiplier Resistor	V_1	70,029	V
Voltage Calculation for Selecting Multiplier Resistor	V_2	2,267	V
Multiplier Resistor	R_{IMO}	1,74E+04	ohm
Select a Standard Value	R_{IMO}	1,80E+04	ohm
Current Loop Power Stage Gain at Loop Crossover	G_{PSC}	2,865	
Current Loop Zero Resistor	$R_{ZC1}=R_{ZC2}$	3,49E+03	ohm

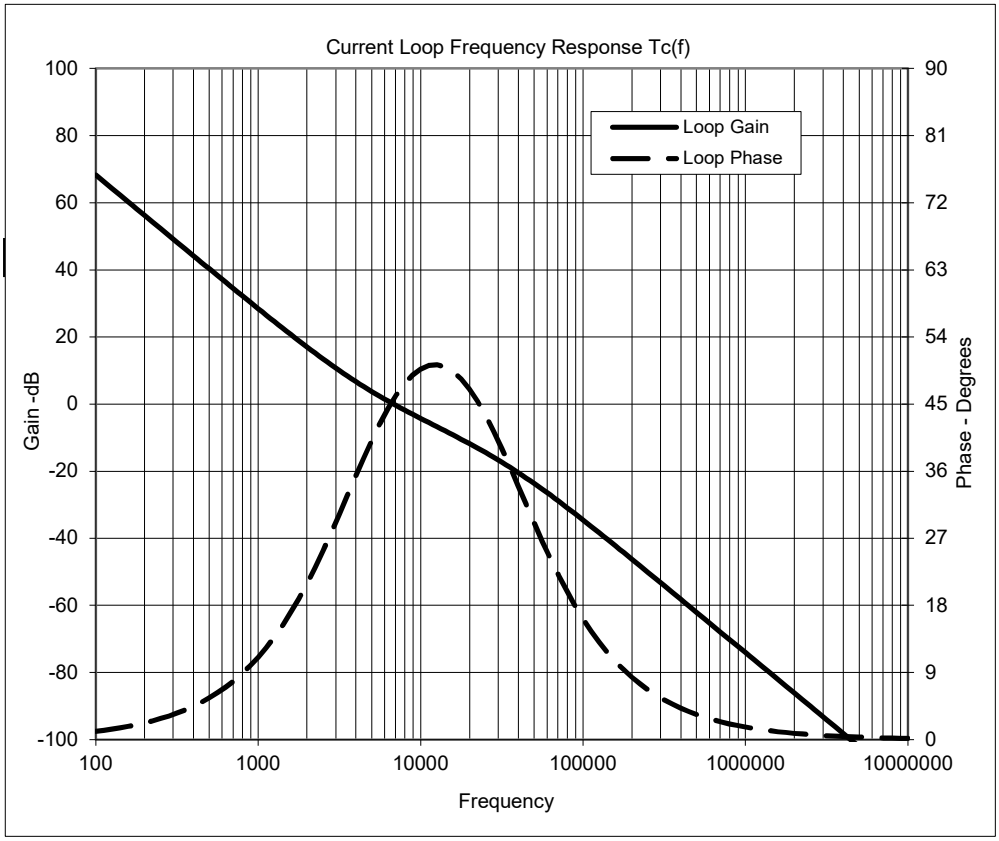
Select a Standard Value	$R_{ZC1}=R_{ZC2}$	3,60E+03	ohm
Current Loop Zero Capacitor	$C_{ZC1}=C_{ZC2}$	7,01E-09	F
Select a Standard Value	$C_{ZC1}=C_{ZC2}$	1,00E-08	F
Current Loop Pole Capacitor	$C_{PC1}=C_{PC2}$	1,40E-09	F
Select a Standard Value	$C_{PC1}=C_{PC2}$	1,50E-09	F
Calculated Soft Start Capacitor (Be sure C_{SS} > or = C_{ZV})	C_{SS}	2,22222E-06	F
Select a Standard Value (Be sure C_{SS} > or = C_{ZV})	C_{SS}	2,20E-06	F
Program Dither Magnitude Resistor	R_{RDM}	3,13E+04	ohm
Select a Standard Value	R_{RDM}	3,16E+04	ohm
Program Dither Rate Capacitor	C_{CDR}	2,08E-10	F
Select a Standard Value	C_{CDR}	2,20E-10	F



Voltage Loop and Current Loop Axis Can be Adjusted Based on Individual Need




-20
-30
-40
-50
27
18
9
0
1
10
100
Frequency


Current Loop Frequency Response Tc(f)
Loop Gain
Loop Phase
Gain -dB
Phase - Degrees
100
80
60
40
20
0
-20
-40
-60
-80
-100
90
81
72
63
54
45
36
27
18
9
0
100
1000
10000
100000
1000000
10000000
Frequency