

Design Tool for Converters using UCC25600

sluc146

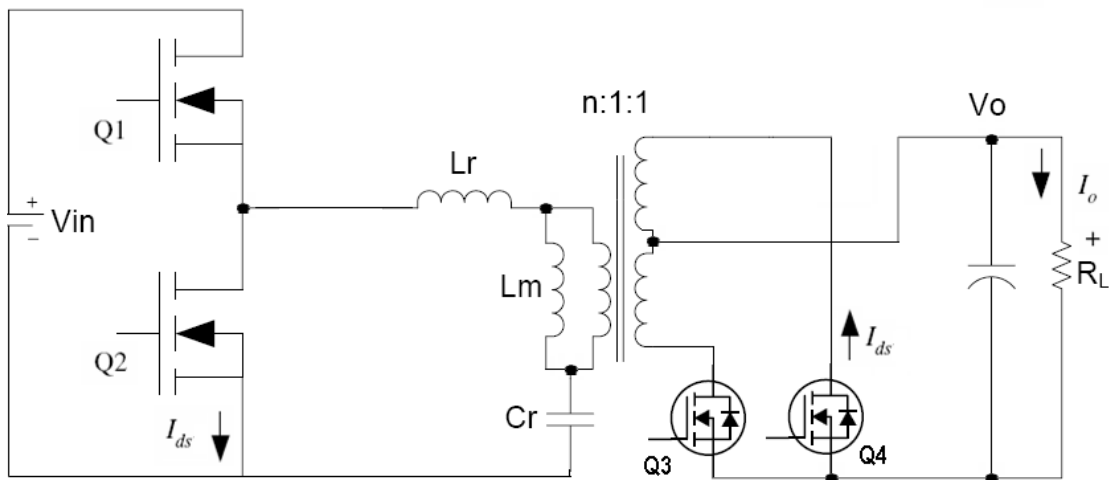
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This tool was designed to work with the design example in UCC25600 datasheet.

Enter values in the		shaded	cells;	
Calculated results shown in BLUE				
Design Parameters:	Variable Names	Value	Units	
Minimum DC Input Voltage	V_{in_min}	640.0	V	
Maximum DC Input Voltage	V_{in_max}	680.0	V	
Switching Frequency	f_{swnom}	100.0	kHz	
Maximum switching frequency	f_{swmax}	350.0	kHz	
Minimum switching frequency	f_{swmin}	60.0	kHz	
Maximum Power Limit	P_{limit}	200.0	W	
Maximum Output Power	P_{OUT}	150.0	W	
Full Load Efficiency	Eff	0.96		
Output voltage	V_O	55.0	V	
Output load resistance at full load	R_L	20.17	Ω	
Input Power				
Input Power	P_{in}	156.3	W	
Ratio of L_m/L_r	m	5.0	*Note	
	Q_r	0.29	*Note	
Voltage gain of resonant network	M_{g_min}	1.20		
	M_{g_max}	1.26		
Transformer				
Transformer Turns Ratio	N_t	7.22		
Resonant Network				
Primary equivalent load resistance	R_{ac}	853.3	Ω	
Resonant capacitance	C_r	3.7	nF	
Resonant inductance	L_r	679.4	μH	
Magnetizing inductance	L_m	1544.0	μH	
Primary winding RMS current	I_{RMS_P}	0.6	A	
Secondary winding RMS current	I_{RMS_S}	2.1	A	
Resonant frequency high	f_O	100.0	kHz	
Resonant frequency low	f_P	55.2	kHz	
Calculated Values for the Design Example				
RT current for switching frequency	I_{RT_max}	4.69	mA	
	I_{RT_min}	0.73	mA	
	RT2	3.41	k Ω	
	RT1	0.63	k Ω	
Soft start time assumed	Tss	25.0	ms	
Soft start capacitance	Css	44.6	nF	
Soft start delay time	Tdel	0.3	ms	
Soft start time adjusted	Tss+Tdel	25.3	ms	
Dead time	Td	500	ns	
DT resistor	R_{DT}	20.0	k Ω	
MOSFETs and Load				
Maximum Output Current Limit, DC	I_{limit}	3.6	A	
Load resistance at maximum current	Rlimit	15.13	Ω	

Maximum Rated Output Current, DC	I _{out}	2.7	A
Primary MOSFET RMS Current	I _{DS_P}	0.62	A
Primary MOSFET Maximum Voltage	V _{DS_P}	816.0	V
Secondary MOSFET RMS Current	I _{DS_S}	2.1	A
Secondary MOSFET Maximum Voltage	V _{DS_S}	141.3	V
Current sensing and protection			
Maximum voltage on resonant capacitor	V _{crpk}	7.20E+02	V
Sensing resistor	R _s	5.19E+00	MΩ
Sensing capacitor	C _s	3.21E+01	pF
Sensing resistor	R _p	2.26E+01	kΩ
Sensing capacitor	C _p	7.37E+00	nF

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*Note: based on the curves, pick up "m" and "Qr" to satisfy Mg_{max} value of: **1.26**

