Design Tool for Converters using UCC25600

sluc146 Rev 1.2 2(

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}	650.0	V
Maximum DC Input Voltage	V_{in_max}	680.0	V
Switching Frequency	f_{swnom}	100.0	kHz
Maximum switching frequency	fswmax	350.0	kHz
Minimum switching frequency	fswmin	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 Lm/Lr	m	5.0	*Note
	Qr	0.50	*Note
Voltage gain of resonant network	Mg_min	1.20	
	Mg_max	1.26	
Transformer			
Transformer Turns Ratio	Nt	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	uH
Magnetizing inductance	L_m	1544.0	uH
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	IRT_max	4.69	mA
	IRT_min	0.73	mA
	RT2	3.41	kΩ
	RT1	0.63	kΩ
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	kΩ
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	Iout	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	Vcrpk	7.20E+02	V
Sensing resistor	Rs	5.19E+00	MΩ
Sensing capacitor	Cs	3.21E+01	pF
Sensing resistor	Rp	2.26E+01	kΩ
Sensing capacitor	Cp	7.37E+00	nF

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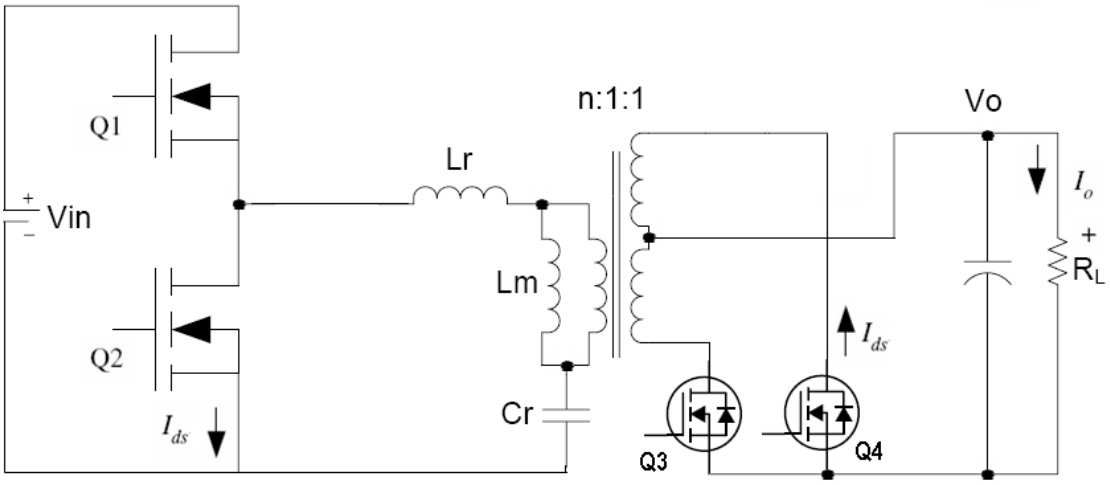
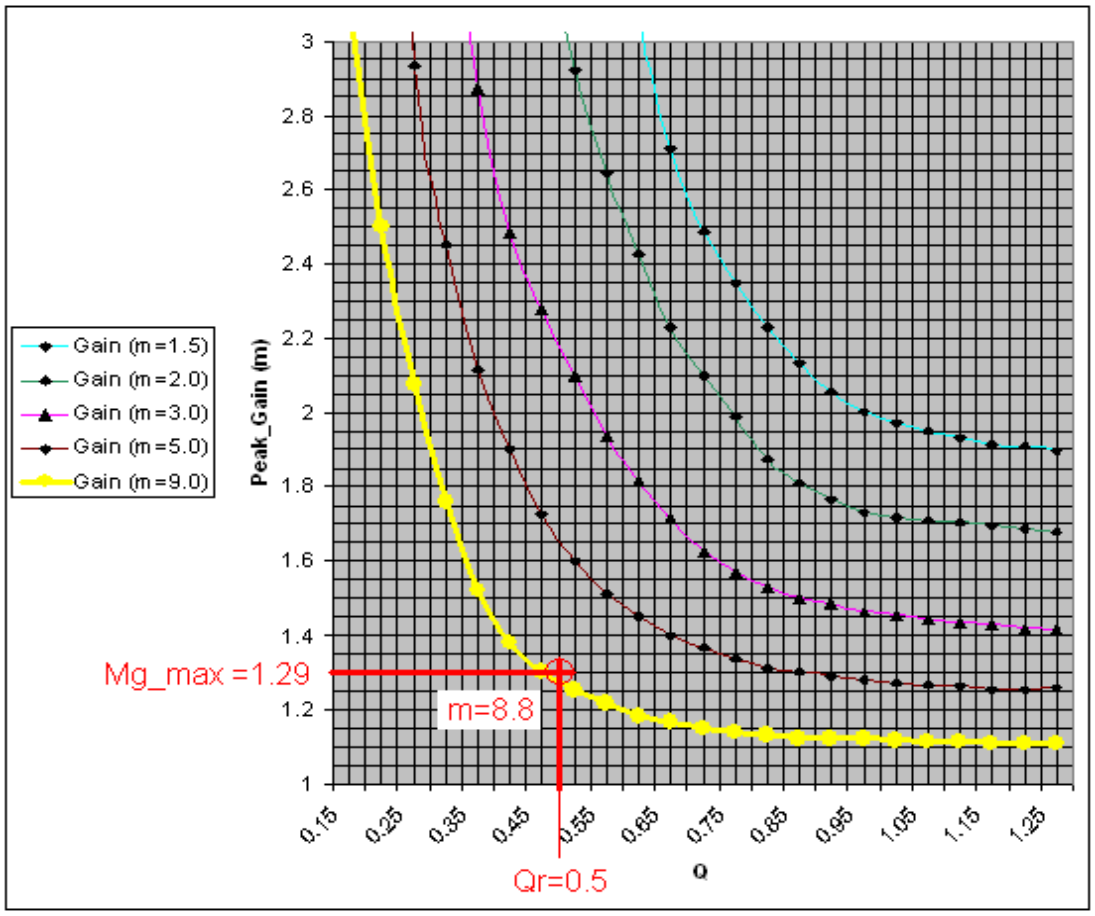
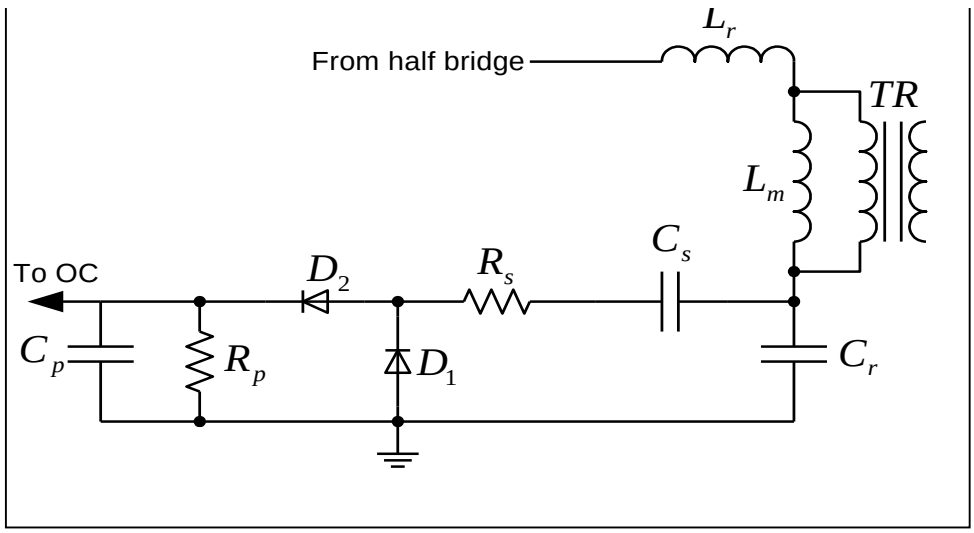


*Note: based on the curves, pick up "m" and "Qr" to satisfy Mg_max value of: **1.26**




L_r
From half bridge
TR
L_m
C_s
To OC
D_2
R_s
C_p
R_p
D_1
C_r