

Basic Discontinuous Boost Converter Design

Jim Christensen

Maxim Integrated Products

Spreadsheet is protected but can be changed to unprotected (no password)

Legend:										
Input Values In Blue -- Adjust to match the circuit						Output Values In Yellow -- Read Only				

Inputs	Symbol	MIN	TYP	MAX	UNITS	Outputs	Symbol	MIN	MAX	UNITS
Input Voltage	V_{IN}	22.80		25.20	V					
Assumed Efficiency (except diode)	η		0.94							
Output LED Voltage	V_{LED}			80.00	V					
LED Current	I_{LED}			0.350	A					
Output Diode Voltage Drop	V_D	0.30		1.00	V					
Switching Frequency	f_O		300.00		KHz					
Acceptable Output Voltage Ripple	V_{ORIP}			0.18	V					
Current Sense Resistor	R_{CS}		0.05		Ω					

Maximum Duty Cycle	DC_{MAX}		0.719		
Maximum On Time	T_{ONMAX}		2.395	μ sec	
Off Time	T_{OFFMAX}		3.333	μ sec	
Output Power	P_{OUT}		28.000	W	
Maximum value of inductance	L_{MAX}	20.8		μ H	

Inductance Value Chosen	L	9.6	12	14.4	μ H
Series Resistance of L	R_L		0.14		Ω

L average current	I_{Lave}		1.306	A
L peak current	I_{Lpk}		4.012	A
L RMS current	I_{Lrms}		1.869	A
L Power Dissipation	P_L		0.489	W
MOSFET RMS current	I_{MOSrms}		1.649	A
MOSFET peak current	I_{MOSpk}		4.012	A
MOSFET peak voltage	V_{MOSpk}		81.000	V
R_{CS} peak voltage	V_{RCSpk}		0.201	V
Output capacitor RMS current	$I_{COUTrms}$		0.905	A
Output cap value (minimum)	C_{OUT}		5.704	μ F