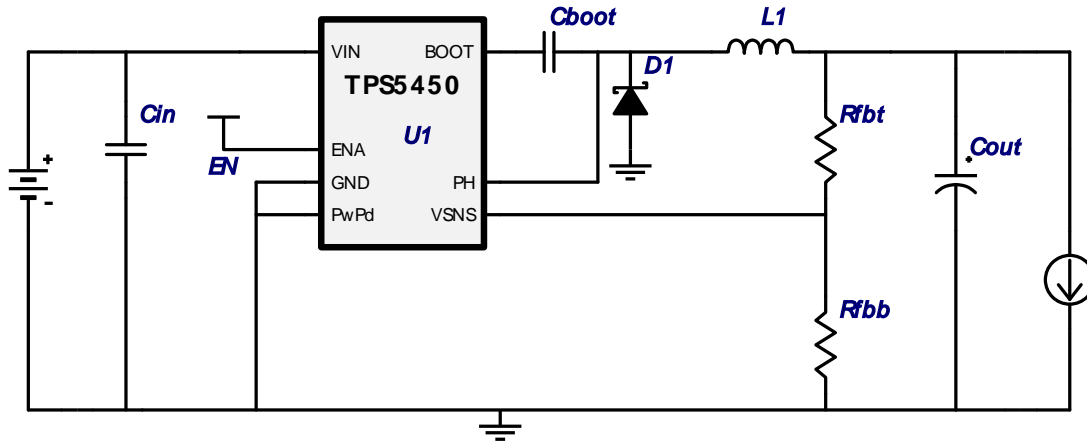




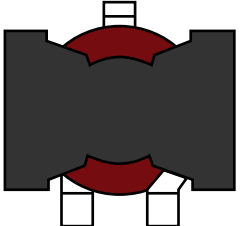




WEBENCH[®] Design Report

 Design : 3488861/24 TPS5450DDA
 TPS5450DDA 21.0V-35.0V to 12.0V @ 5.0A

Electrical BOM

#	Name	Manufacturer	Part Number	Quantity	Price	Properties	Footprint
1.	Cboot	Kemet	C0805C103K5RACTU Series= X7R	1	\$0.01	Cap= 10.0 nF ESR= 1.739 Ohm VDC= 50.0 V IRMS= 411.0 mA	 0805 13mm ²
2.	Cin	TDK	C5750X7R1H106M Series= X7R	1	\$0.68	Cap= 10.0 µF ESR= 3.0 mOhm VDC= 50.0 V IRMS= 5.5 A	 2220 60mm ²
3.	Cout	Kemet	T495D686K020ATE150 Series= T495	1	\$0.60	Cap= 68.0 µF ESR= 150.0 mOhm VDC= 20.0 V IRMS= 900.0 mA	 7343-31 59mm ²
4.	D1	Vishay-Semiconductor	50WQ10FNPBF	1	\$0.41	VF@Io= 770.0 mV VRRM= 100.0 V	 DPAK 102mm ²
5.	L1	Würth Elektronik eiSos	7443634700	1	\$6.70	L= 47.0 µH DCR= 12.2 mOhm	 IND_WE-HCF 540mm ²
6.	Rfbb	Vishay-Dale	CRCW04021K13FKED Series= CRCW..e3	1	\$0.01	Res= 1.13 kOhm Power= 63.0 mW Tolerance= 1.0%	 0402 8mm ²
7.	Rfbt	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	1	\$0.01	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	 0402 8mm ²

#	Name	Manufacturer	Part Number	Quantity	Price	Properties	Footprint
8.	U1	Texas Instruments	TPS5450DDA	1	\$2.25	Switcher	

R-PDSO-G8 57mm²

Operating Values

#	Name	Value	Category	Description
1.	BOM Count	8.0		Total Design BOM count
2.	Total BOM	\$10.672		Total BOM Cost
3.	Cin IRMS	1.904 A	Current	Input capacitor RMS ripple current
4.	Cout IRMS	102.17 m A	Current	Output capacitor RMS ripple current
5.	IC Ipk	5.177 A	Current	Peak switch current in IC
6.	Iin Avg	1.846 A	Current	Average input current
7.	L Ipp	353.929 m A	Current	Peak-to-peak inductor ripple current
8.	M1 Irms	3.007 A	Current	Q lavg
9.	FootPrint	846.0 mm ²	General	Total Foot Print Area of BOM components
10.	Frequency	500.0 k Hz	General	Switching frequency
11.	IC Tolerance	18.315 m V	General	IC Feedback Tolerance
12.	M Vds Act	456.983 m V	General	Voltage drop across the MosFET
13.	Mode	CCM	General	Conduction Mode
14.	Pout	60.0 W	General	Total output power
15.	D1 Tj	113.733 degC	Op_Point	D1 junction temperature
16.	Vout OP	12.0 V	Op_Point	Operational Output Voltage
17.	Cross Freq	12.597 k Hz	Op_point	Bode plot crossover frequency
18.	Duty Cycle	36.162 %	Op_point	Duty cycle
19.	Efficiency	92.88 %	Op_point	Steady state efficiency
20.	IC Tj	93.821 degC	Op_point	IC junction temperature
21.	ICThetaJA	30.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
22.	IOUT_OP	5.0 A	Op_point	Iout operating point
23.	Phase Marg	73.424 deg	Op_point	Bode Plot Phase Margin
24.	VIN_OP	35.0 V	Op_point	Vin operating point
25.	Vout p-p	-Infinity	Op_point	Peak-to-peak output ripple voltage
26.	Cin Pd	10.871 m W	Power	Input capacitor power dissipation
27.	Cout Pd	1.566 m W	Power	Output capacitor power dissipation
28.	Diode Pd	2.458 W	Power	Diode power dissipation
29.	IC Pd	1.794 W	Power	IC power dissipation
30.	L Pd	335.5 m W	Power	Inductor power dissipation
31.	Total Pd	4.599 W	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	Iout	5.0 A	Maximum Output Current
2.	Iout1	5.0 Amps	Output Current #1
3.	VinMax	35.0 V	Maximum input voltage
4.	VinMin	21.0 V	Minimum input voltage
5.	Vout	12.0 V	Output Voltage
6.	Vout1	12.0 Volt	Output Voltage #1
7.	base_pn	TPS5450	National Based Product Number
8.	Ta	40.0 degC	Ambient temperature

Design Assistance

1. Feature Highlights: 5A, 500kHz Fixed Switching Frequency, Internal Compensation
2. **TPS5450** Product Folder : <http://www.ti.com/product/tps5450> : contains the data sheet and other resources.

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