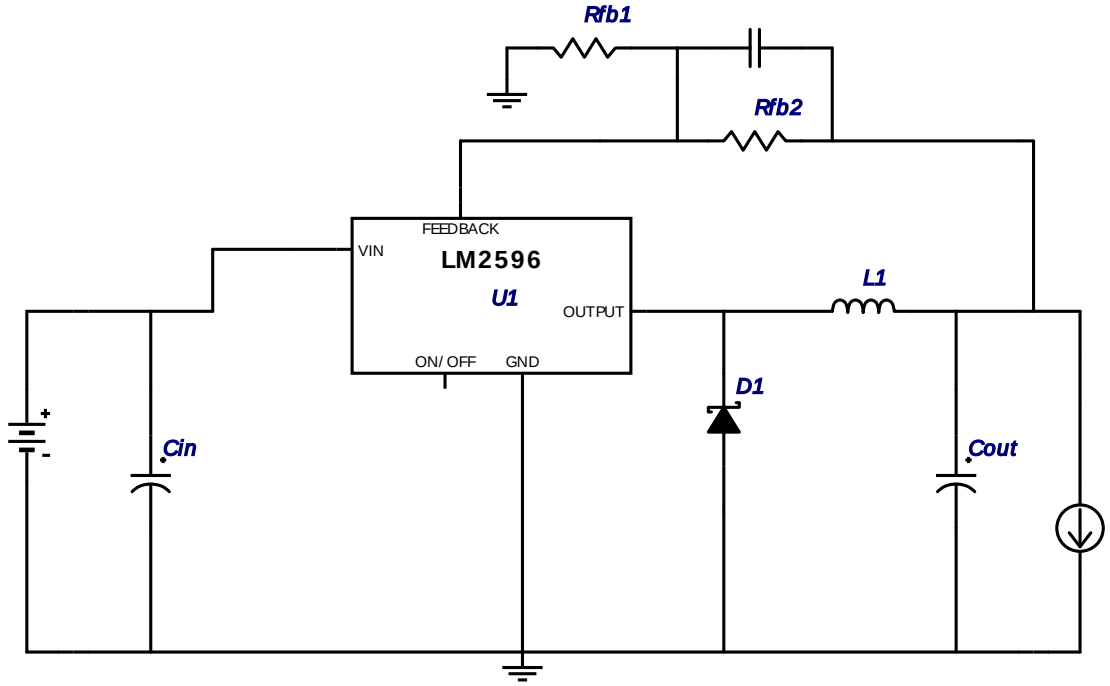
WEBENCH® Design Report

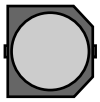
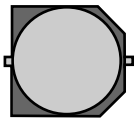
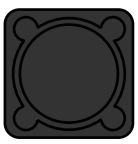
VinMin = 8.0V
VinMax = 13.0V
Vout = 6.0V
Iout = 2.5A

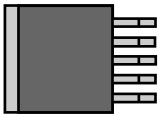
Device = LM2596T-ADJ
Topology = Buck
Created = 12/6/11 2:14:22 PM
BOM Cost = $3.38
Total Pd = 2.8 W
Footprint = 743.0 mm2
BOM Count = 8

Design : 1229352/7 LM2596T-ADJ
Design 7 - LM2596T-ADJ



Electrical BOM

#	Name	Manufacturer	Part Number	Quantity	Price	Properties	Footprint
1.	Cff	Yageo America	CC0805KRX7R9BB472 Series= X7R	1	$0.01	Cap= 4.7 nF ESR= 0.0 Ohm VDC= 50.0 V IRMS= 0.0 A	 0805 13mm2
2.	Cin	Nippon Chemi-Con	APXH200ARA470MH70G Series= PXH	1	$0.59	Cap= 47.0 µF ESR= 45.0 mOhm VDC= 20.0 V IRMS= 2.0 A	 CAPSMT_62_H70 110mm2
3.	Cout	Panasonic	EEE-FC1A471P Series= FC	1	$0.24	Cap= 470.0 µF ESR= 150.0 mOhm VDC= 10.0 V IRMS= 220.0 mA	 SM_RADIAL_G 172mm2
4.	D1	Diodes Inc.	B220A-13-F	1	$0.09	VF@Io= 500.0 mV VRRM= 20.0 V	 SMA 37mm2
5.	L1	Bourns	SRR1210-330M	1	$0.48	L= 33.0 µH DCR= 52.0 mOhm	 SRR1210 196mm2
6.	Rfb1	Vishay-Dale	CRCW04021K00FKED Series= CRCW..e3	1	$0.01	Res= 1,000 Ohm Power= 63.0 mW Tolerance= 1.0%	 0402 8mm2

#	Name	Manufacturer	Part Number	Quantity	Price	Properties	Footprint
7.	Rfb2	Vishay-Dale	CRCW04023K83FKED Series= CRCW..e3	1	$0.01	Res= 3.83 kOhm Power= 63.0 mW Tolerance= 1.0%	0402 8mm2
8.	U1	Texas Instruments	LM2596T-ADJ	1	$1.95	Switcher	 TO-263-5 199mm2

Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	1.249 A	Current	Input capacitor RMS ripple current
2.	Cout IRMS	181.886 m A	Current	Output capacitor RMS ripple current
3.	IC Ipk	2.815 A	Current	Peak switch current in IC
4.	Iin Avg	1.369 A	Current	Average input current
5.	L Ipp	630.071 m A	Current	Peak-to-peak inductor ripple current
6.	Q Iavg	1.3 A	Current	Q Iavg
7.	BOM Count	8.0	General	Total Design BOM count
8.	FootPrint	743.0 mm2	General	Total Foot Print Area of BOM components
9.	Frequency	150.0 k Hz	General	Switching frequency
10.	IC Tolerance	0.0 V	General	IC Feedback Tolerance
11.	Mode	CCM	General	Conduction Mode
12.	Pout	15.0 W	General	Total output power
13.	Q Vsat Act	1.004 V	General	Q Vsat
14.	Total BOM	$3.38	General	Total BOM Cost
15.	Cross Freq	91.201 k Hz	Op_point	Bode plot crossover frequency
16.	Duty Cycle	52.018 deg	Op_point	Duty cycle
17.	Efficiency	84.289 %	Op_point	Steady state efficiency
18.	IC Tj	117.805 degC	Op_point	IC junction temperature
19.	ICThetaJA	50.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
20.	IOUT_OP	2.5 A	Op_point	Iout operating point
21.	Phase Marg	101.862 deg	Op_point	Bode Plot Phase Margin
22.	VIN_OP	13.0 V	Op_point	Vin operating point
23.	Vout p-p	94.511 m V	Op_point	Peak-to-peak output ripple voltage
24.	Cin Pd	70.198 m W	Power	Input capacitor power dissipation
25.	Cout Pd	4.962 m W	Power	Output capacitor power dissipation
26.	Diode Pd	599.779 m W	Power	Diode power dissipation
27.	IC Pd	1.756 W	Power	IC power dissipation
28.	L Pd	357.5 m W	Power	Inductor power dissipation
29.	Total Pd	2.796 W	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	Iout	2.5 A	Maximum Output Current
2.	Iout1	2.5 Amps	Output Current #1
3.	VinMax	13.0 V	Maximum input voltage
4.	VinMin	8.0 V	Minimum input voltage
5.	Vout	6.0 V	Output Voltage
6.	Vout1	6.0 Volt	Output Voltage #1
7.	base_pn	LM2596	National Based Product Number
8.	Ta	30.0 degC	Ambient temperature

Design Assistance

1. **LM2596** Product Folder : http://www.national.com/pf/LM/LM2596.html : contains the data sheet and other resources.