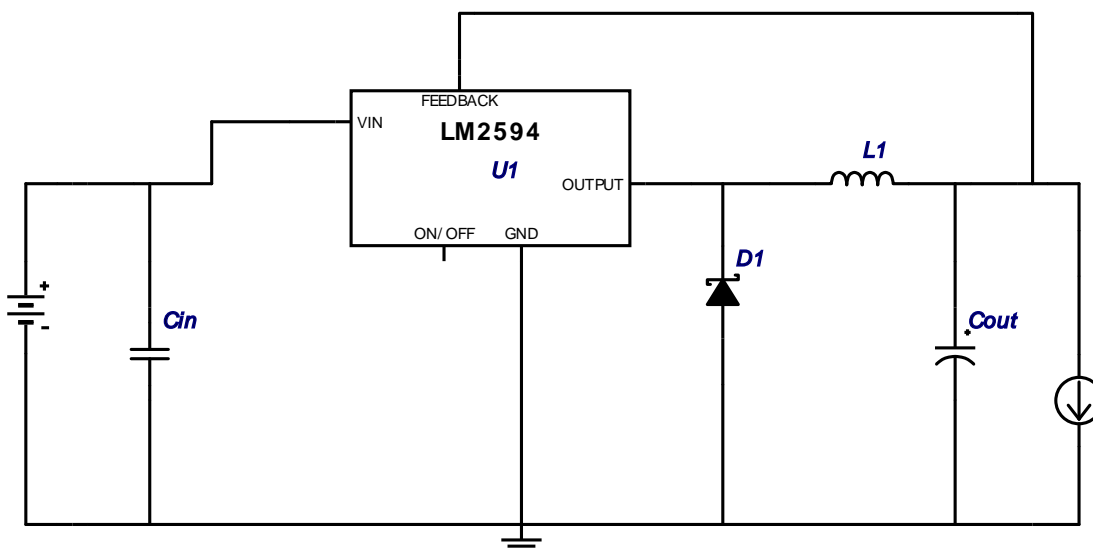


WEBENCH® Design Report




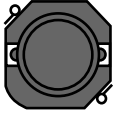

Design : 101856/4 LM2594MX-5.0
Design 4 - LM2594MX-5.0

VinMin = 8.0V
VinMax = 15.0V
Vout = 5.0V
Iout = 0.5A

Device = LM2594MX-5.0
Topology = Buck
Created = 12/11/11 2:30:50 PM
BOM Cost = \$2.11
Total Pd = 0.67 W
Footprint = 331.0 mm2
BOM Count = 5



Electrical BOM

#	Name	Manufacturer	Part Number	Quantity	Price	Properties	Footprint
1.	Cin	TDK	C3225X7R1E106M Series= X7R	1	\$0.18	Cap= 10.0 μ F ESR= 2.7 mOhm VDC= 25.0 V IRMS= 3.0 A	 1210 23mm2
2.	Cout	Panasonic	EEE-FK1C680P Series= FK	1	\$0.12	Cap= 68.0 μ F ESR= 360.0 mOhm VDC= 16.0 V IRMS= 240.0 mA	 SM_RADIAL_D 84mm2
3.	D1	ON Semiconductor	MBR0520LT1G	1	\$0.06	VF@Io= 385.0 mV VRRM= 20.0 V	 SOD-123 22mm2
4.	L1	Coilcraft	MSS1048-224KLB	1	\$0.47	L= 220.0 μ H DCR= 500.0 mOhm	 MSS1048 146mm2
5.	U1	Texas Instruments	LM2594MX-5.0	1	\$1.28	Switcher	 M08A 55mm2

Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	241.452 m A	Current	Input capacitor RMS ripple current
2.	Cout IRMS	29.66 m A	Current	Output capacitor RMS ripple current
3.	IC Ipk	551.372 m A	Current	Peak switch current in IC
4.	Iin Avg	211.29 m A	Current	Average input current
5.	L Ipp	102.744 m A	Current	Peak-to-peak inductor ripple current
6.	Q Iavg	185.187 m A	Current	Q Iavg
7.	BOM Count	5.0	General	Total Design BOM count

#	Name	Value	Category	Description
8.	FootPrint	331.0 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	2.5 W	General	Total output power
13.	Q Vsat Act	845.638 m V	General	Q Vsat
14.	Total BOM	\$2.11	General	Total BOM Cost
15.	Cross Freq	10.0 k Hz	Op_point	Bode plot crossover frequency
16.	Duty Cycle	37.037 deg	Op_point	Duty cycle
17.	Efficiency	78.882 %	Op_point	Steady state efficiency
18.	IC Tj	90.018 degC	Op_point	IC junction temperature
19.	ICThetaJA	150.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
20.	IOUT_OP	500.0 m A	Op_point	Iout operating point
21.	Phase Marg	57.133 deg	Op_point	Bode Plot Phase Margin
22.	VIN_OP	15.0 V	Op_point	Vin operating point
23.	Vout p-p	36.988 m V	Op_point	Peak-to-peak output ripple voltage
24.	Cin Pd	157.408 μ W	Power	Input capacitor power dissipation
25.	Cout Pd	316.687 μ W	Power	Output capacitor power dissipation
26.	Diode Pd	121.203 m W	Power	Diode power dissipation
27.	IC Pd	400.119 m W	Power	IC power dissipation
28.	L Pd	137.5 m W	Power	Inductor power dissipation
29.	Total Pd	669.303 m W	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	Iout	500.0 mA	Maximum Output Current
2.	Iout1	500.0 mAmps	Output Current #1
3.	VinMax	15.0 V	Maximum input voltage
4.	VinMin	8.0 V	Minimum input voltage
5.	Vout	5.0 V	Output Voltage
6.	Vout1	5.0 Volt	Output Voltage #1
7.	base_pn	LM2594	National Based Product Number
8.	Ta	30.0 degC	Ambient temperature

Design Assistance

1. **LM2594** Product Folder : <http://www.national.com/pf/LM/LM2594.html> : contains the data sheet and other resources.

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You should completely validate and test your design implementation to confirm the system functionality for your application prior to production.

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