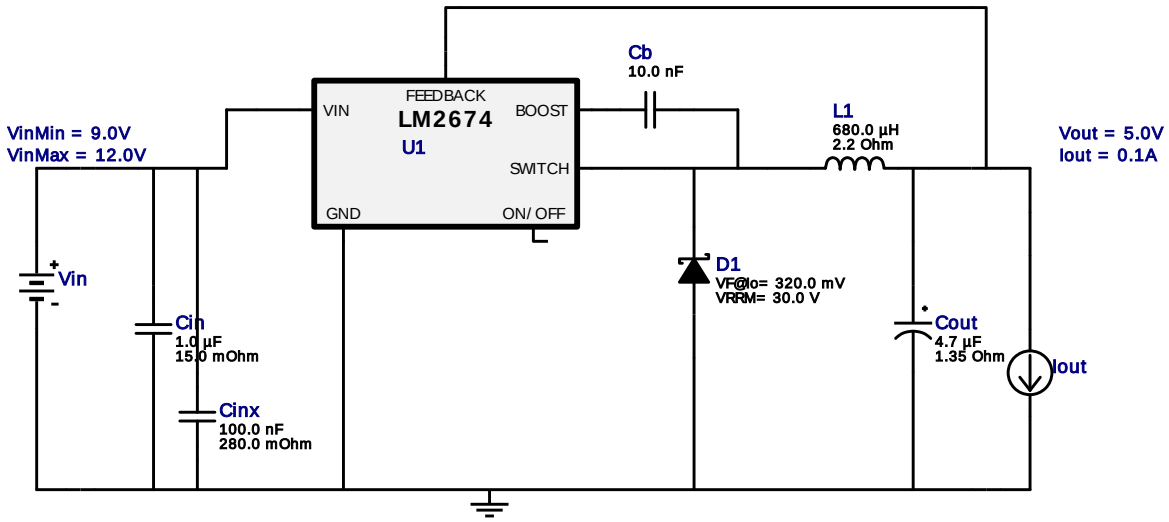
WEBENCH® Design Report

VinMin = 9.0V
VinMax = 12.0V
Vout = 5.0V
Iout = 0.1A

Device = LM2674M-5.0/NOPB
Topology = Buck
Created = 9/13/13 1:30:55 PM
BOM Cost = $1.97
Total Pd = 0.09W
Footprint = 226.0mm2
BOM Count = 7

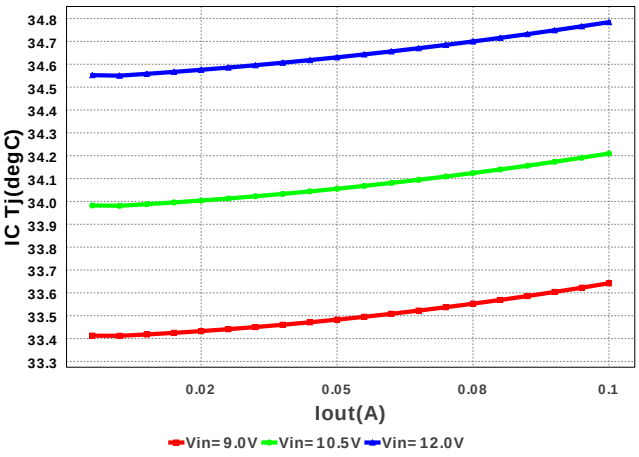
Design : 1111956/10 LM2674M-5.0/NOPB
LM2674M-5.0/NOPB 9.0V-12.0V to 5.0V @ 0.1A



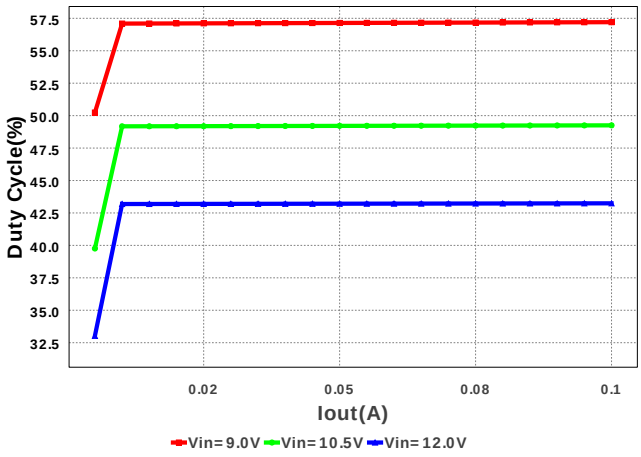
Electrical BOM

#	Name	Manufacturer	Part Number	Properties	Qty	Price	Footprint
1.	Cb	MuRata	GRM216R71H103KA01D Series= X7R	Cap= 10.0 nF VDC= 50.0 V IRMS= 0.0 A	1	$0.01	0805 13mm2
2.	Cin	Kemet	C0805C105K4RACTU Series= X7R	Cap= 1.0 µF ESR= 15.0 mOhm VDC= 16.0 V IRMS= 8.19 A	1	$0.02	0805 13mm2
3.	Cinx	AVX	08053C104KAT2A Series= X7R	Cap= 100.0 nF ESR= 280.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	$0.01	0805 13mm2
4.	Cout	Panasonic	EEE-FK1V4R7R Series= FK	Cap= 4.7 µF ESR= 1.35 Ohm VDC= 35.0 V IRMS= 90.0 mA	1	$0.09	SM_RADIAL_B 47mm2
5.	D1	Toshiba	CMS06	VF@Io= 320.0 mV VRRM= 30.0 V	1	$0.19	M-FLAT 29mm2
6.	L1	Bourns	SRR6603-681ML	L= 680.0 µH DCR= 2.2 Ohm	1	$0.45	SRR6603 55mm2
7.	U1	Texas Instruments	LM2674M-5.0/NOPB	Switcher	1	$1.20	M08A 55mm2

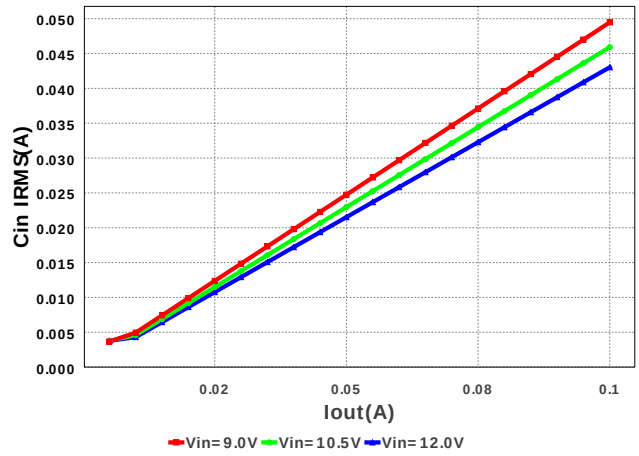
IC Tj



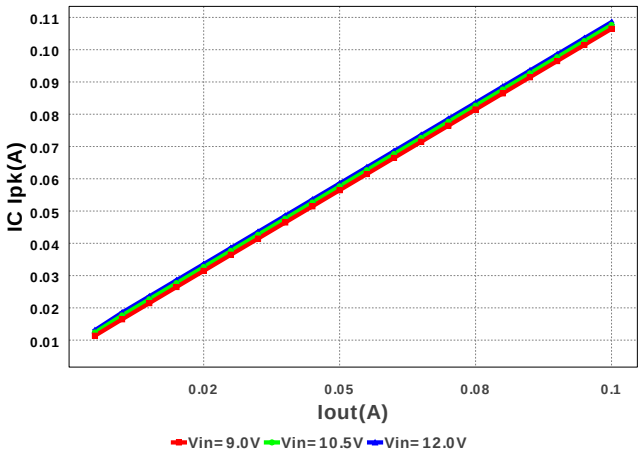
Duty Cycle



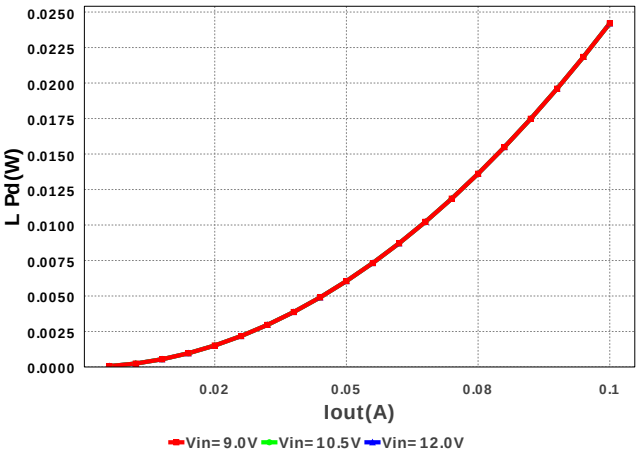
Cin IRMS



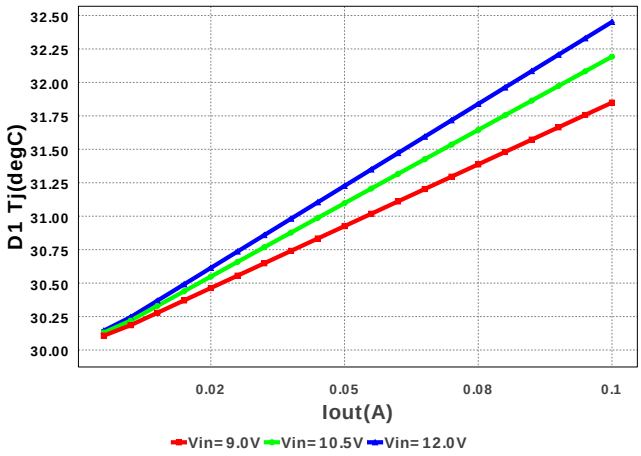
IC Ipk



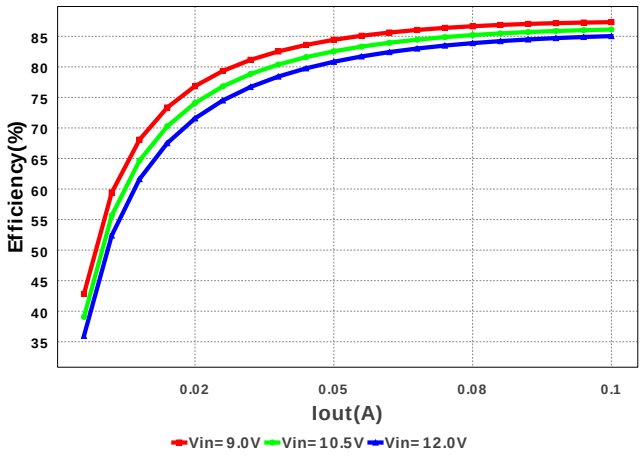
L Pd



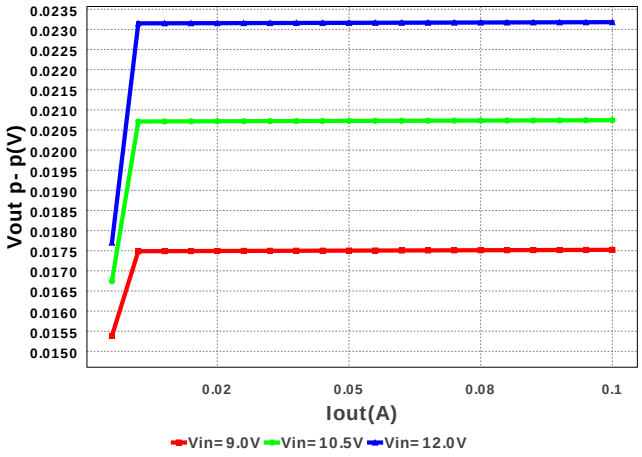
D1 Tj



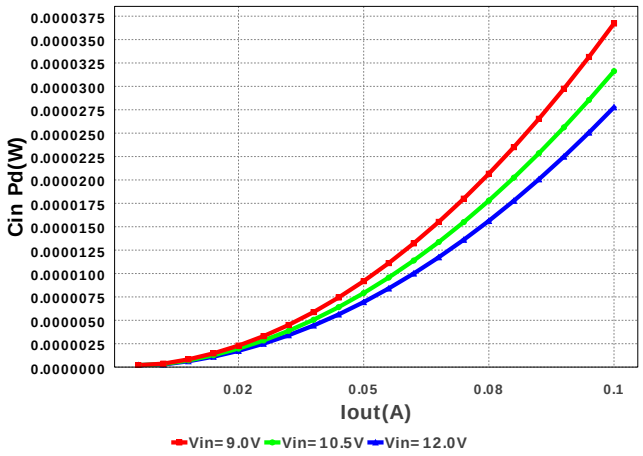
Efficiency



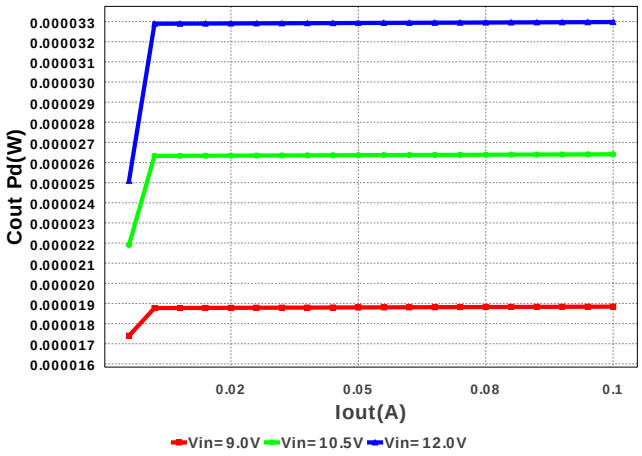
Vout p- p



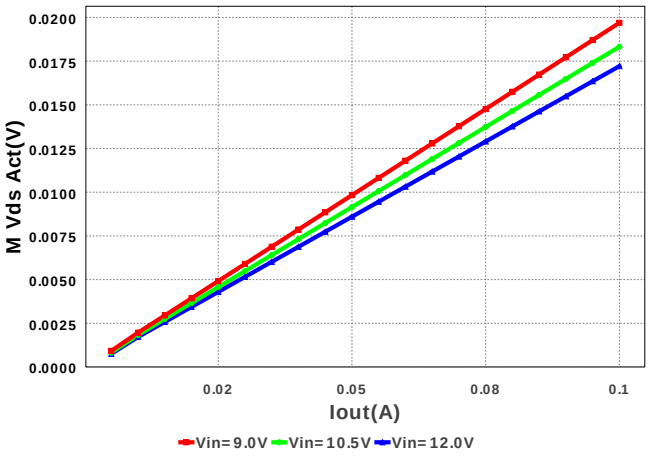
Cin Pd



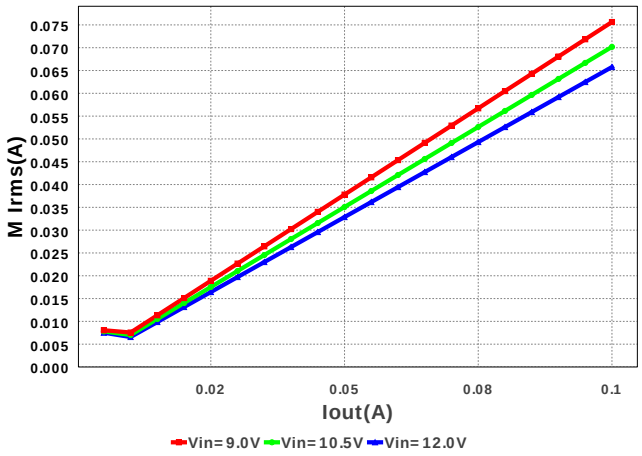
Cout Pd

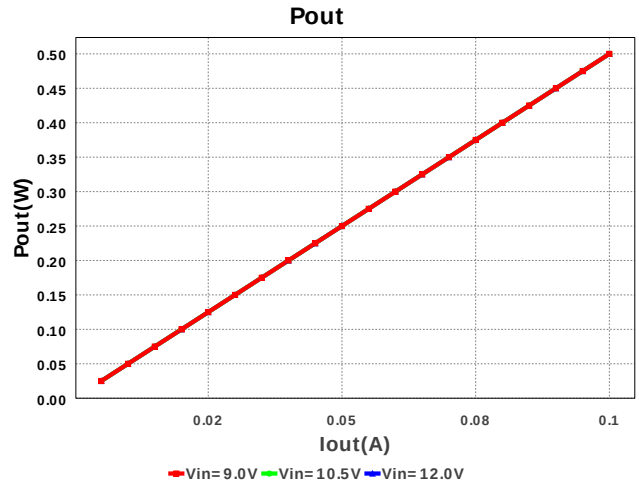


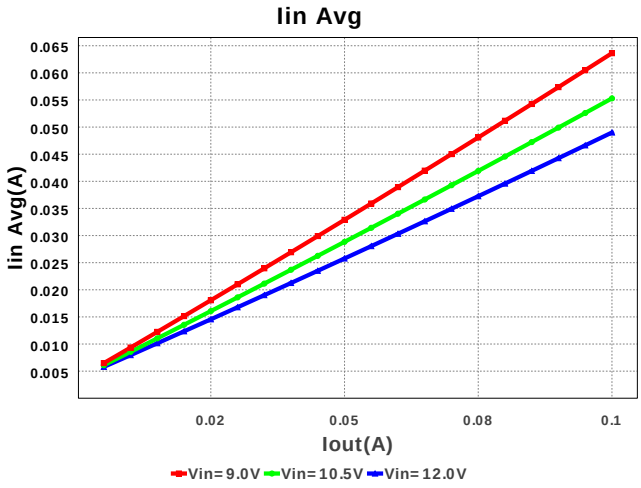
M Vds Act

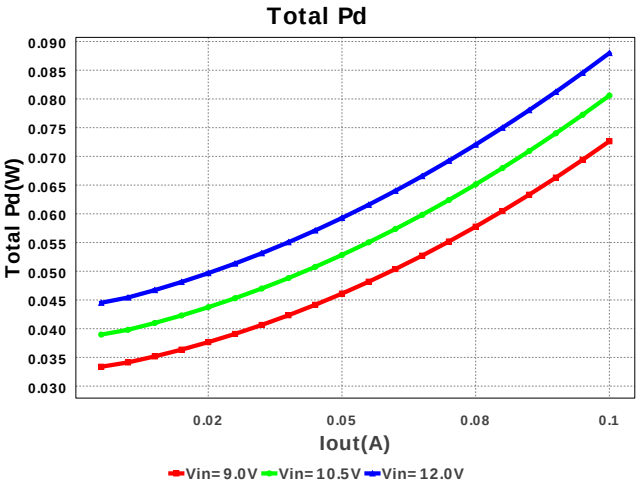


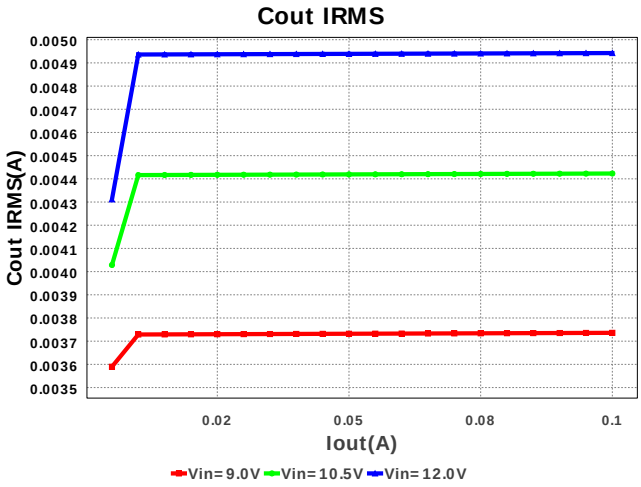
M Irms

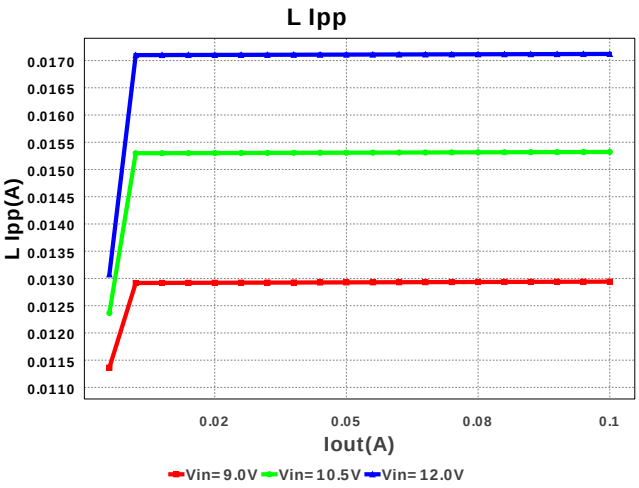


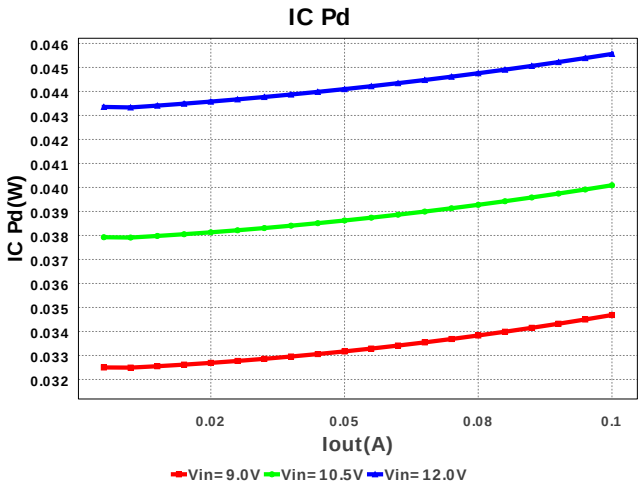


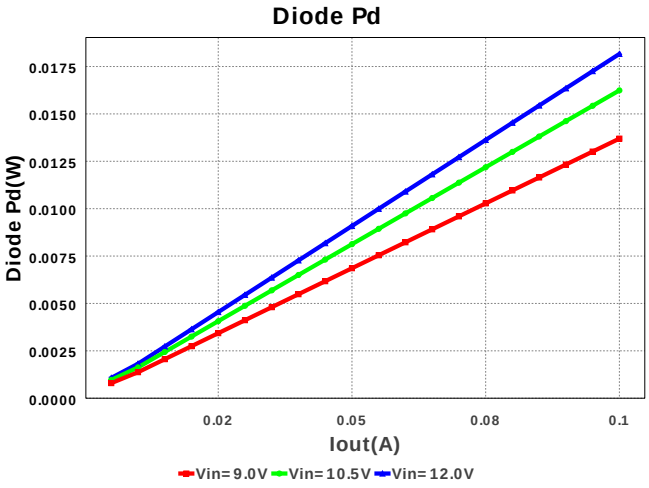












Operating Values

#	Name	Value	Category	Description
1.	Cin IRMS	43.027 mA	Current	Input capacitor RMS ripple current
2.	Cout IRMS	4.942 mA	Current	Output capacitor RMS ripple current
3.	IC Ipk	108.56 mA	Current	Peak switch current in IC
4.	Iin Avg	48.999 mA	Current	Average input current
5.	L Ipp	17.121 mA	Current	Peak-to-peak inductor ripple current
6.	M1 Irms	65.759 mA	Current	Q Iavg
7.	BOM Count	7	General	Total Design BOM count
8.	FootPrint	226.0 mm2	General	Total Foot Print Area of BOM components
9.	Frequency	260.0 kHz	General	Switching frequency
10.	IC Tolerance	75.0 mV	General	IC Feedback Tolerance
11.	M Vds Act	17.212 mV	General	Voltage drop across the MosFET
12.	Mode	CCM	General	Conduction Mode
13.	Pout	500.0 mW	General	Total output power
14.	Total BOM	$1.97	General	Total BOM Cost
15.	D1 Tj	32.452 degC	Op_Point	D1 junction temperature
16.	Vout OP	5.0 V	Op_Point	Operational Output Voltage
17.	Cross Freq	32.639 kHz	Op_point	Bode plot crossover frequency
18.	Duty Cycle	43.242 %	Op_point	Duty cycle
19.	Efficiency	85.036 %	Op_point	Steady state efficiency
20.	IC Tj	34.784 degC	Op_point	IC junction temperature
21.	ICThetaJA	105.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
22.	IOUT_OP	100.0 mA	Op_point	Iout operating point
23.	Phase Marg	80.471 deg	Op_point	Bode Plot Phase Margin
24.	VIN_OP	12.0 V	Op_point	Vin operating point
25.	Vout p-p	23.179 mV	Op_point	Peak-to-peak output ripple voltage
26.	Cin Pd	27.77 µW	Power	Input capacitor power dissipation
27.	Cout Pd	32.976 µW	Power	Output capacitor power dissipation
28.	Diode Pd	18.162 mW	Power	Diode power dissipation
29.	IC Pd	45.563 mW	Power	IC power dissipation
30.	L Pd	24.2 mW	Power	Inductor power dissipation
31.	Total Pd	87.987 mW	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	Iout	100.0 mA	Maximum Output Current
2.	Iout1	100.0 mAmps	Output Current #1
3.	VinMax	12.0 V	Maximum input voltage
4.	VinMin	9.0 V	Minimum input voltage
5.	Vout	5.0 V	Output Voltage
6.	Vout1	5.0 Volt	Output Voltage #1
7.	base_pn	LM2674	Base Product Number
8.	source	DC	Input Source Type
9.	Ta	30.0 degC	Ambient temperature

Design Assistance

1. **LM2674** Product Folder : http://www.ti.com/product/lm2674 : contains the data sheet and other resources.