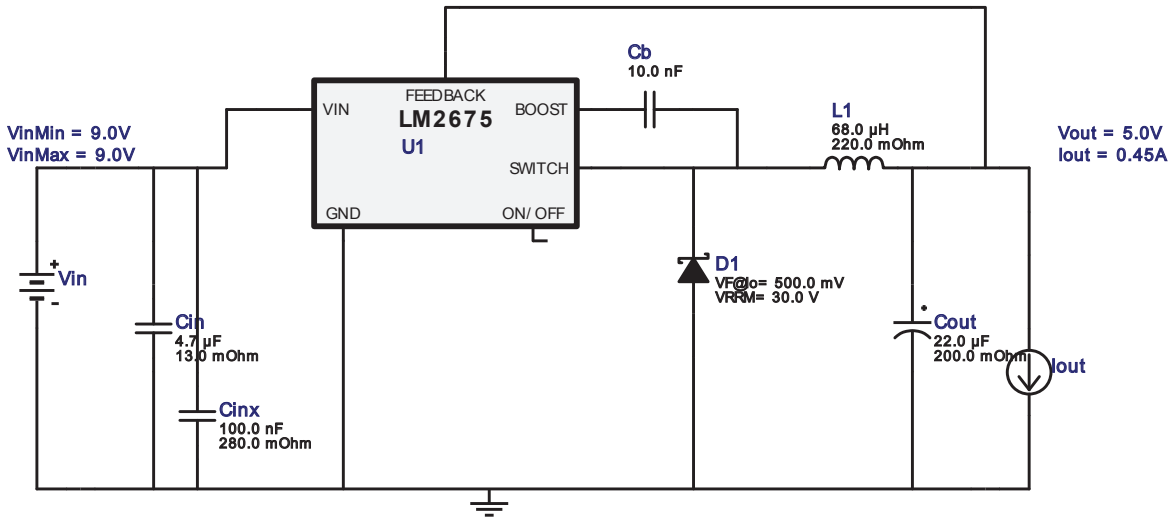
WEBENCH® Design Report

VinMin = 9.0V
VinMax = 9.0V
Vout = 5.0V
Iout = 0.45A

Device = LM2675M-5.0/NOPB
Topology = Buck
Created = 10/14/13 11:50:56 AM
BOM Cost = $2.50
Total Pd = 0.21W
Footprint = 335.0mm2
BOM Count = 7

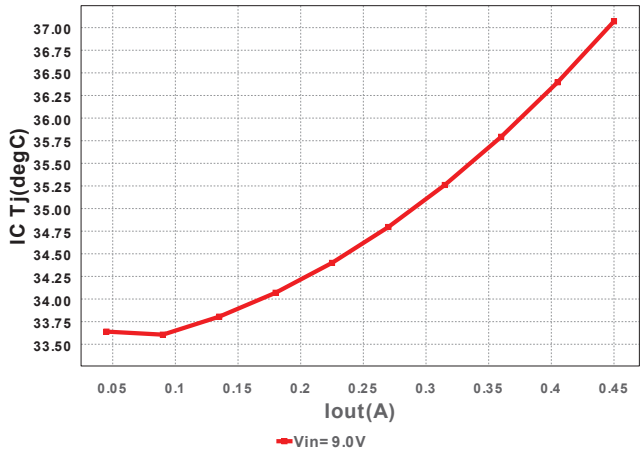
Design : 3867961/16 LM2675M-5.0/NOPB
LM2675M-5.0/NOPB 9.0V-9.0V to 5.0V @ 0.45A



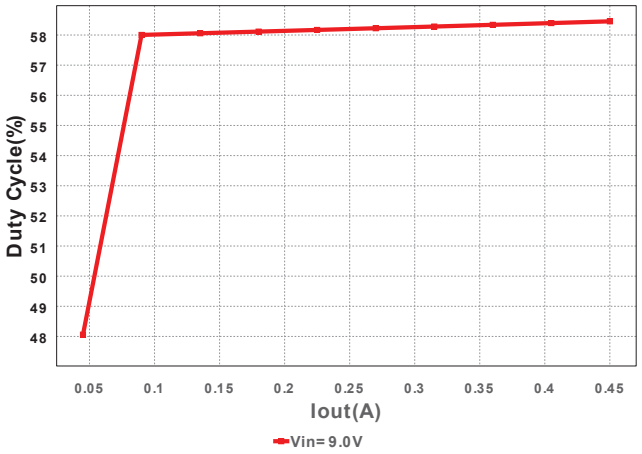
Electrical BOM

#	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 7mm2
2.	Cin	Kemet	C1206C475K4PACTU Series= X5R	Cap= 4.7 µF ESR= 13.0 mOhm VDC= 16.0 V IRMS= 4.9 A	1	$0.04	1206 11mm2
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 7mm2
4.	Cout	Vishay-Sprague	593D226X9025D2TE3 Series= 593D	Cap= 22.0 µF ESR= 200.0 mOhm VDC= 25.0 V IRMS= 870.0 mA	1	$0.51	7343-31 59mm2
5.	D1	Diodes Inc.	B130-13-F	VF@Io= 500.0 mV VRRM= 30.0 V	1	$0.06	SMA 37mm2
6.	L1	Bourns	SDR1006-680KL	L= 68.0 µH DCR= 220.0 mOhm	1	$0.27	SDR1006 139mm2
7.	U1	Texas Instruments	LM2675M-5.0/NOPB	Switcher	1	$1.60	M08A 55mm2

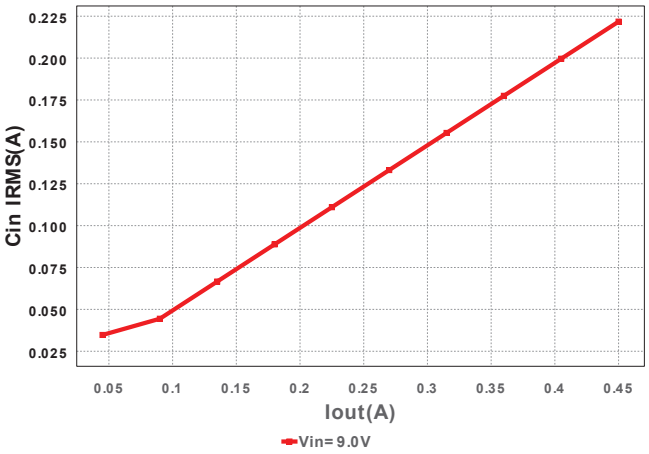
IC Tj



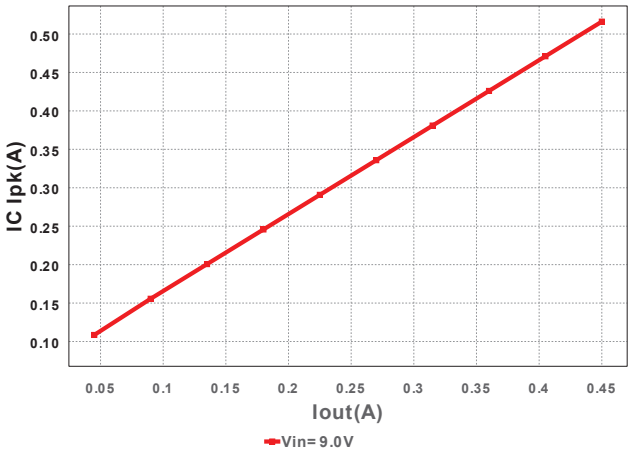
Duty Cycle



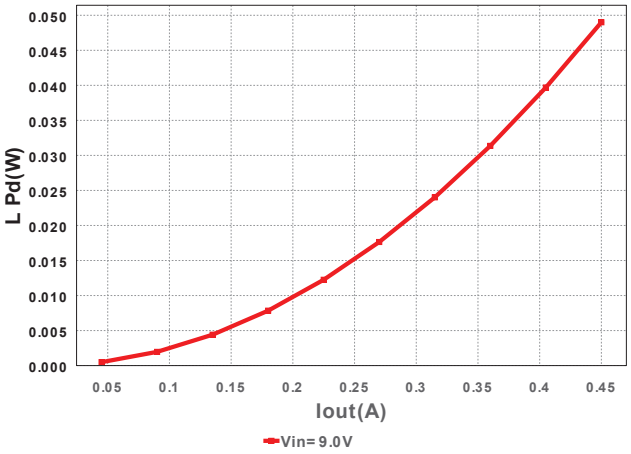
Cin IRMS



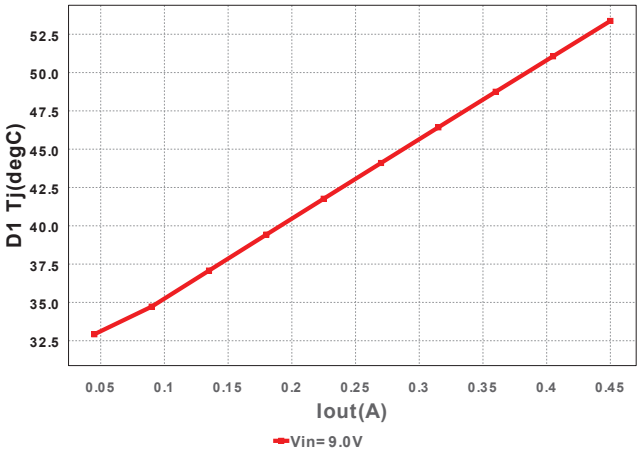
IC Ipk

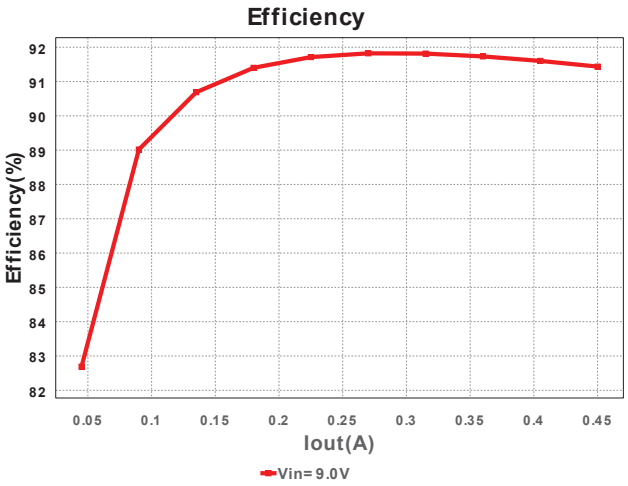


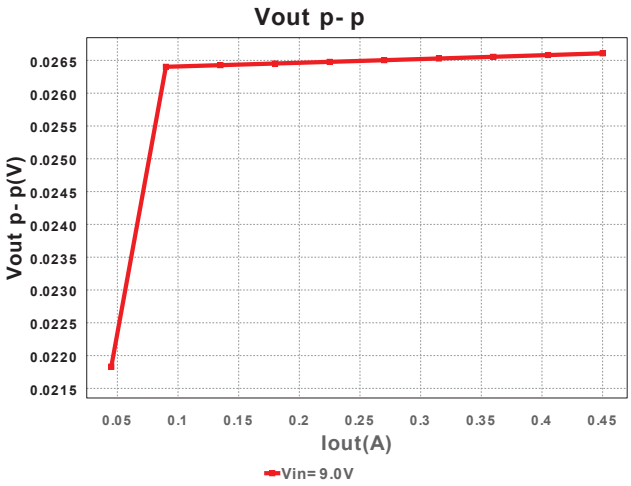
L Pd

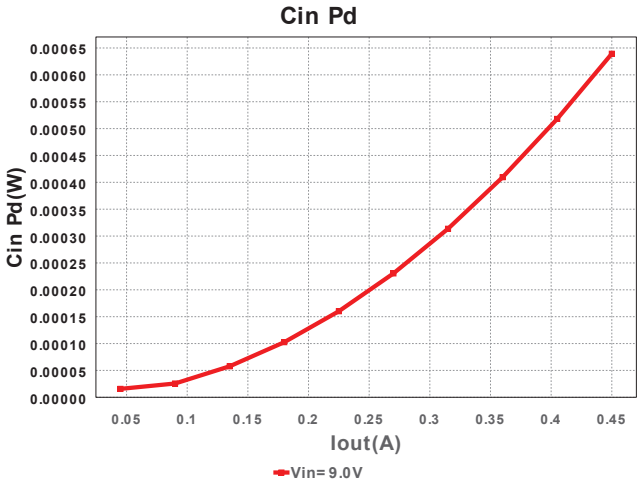


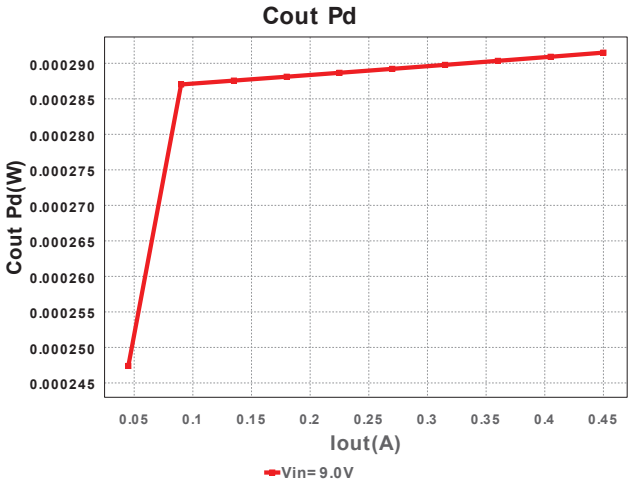
D1 Tj

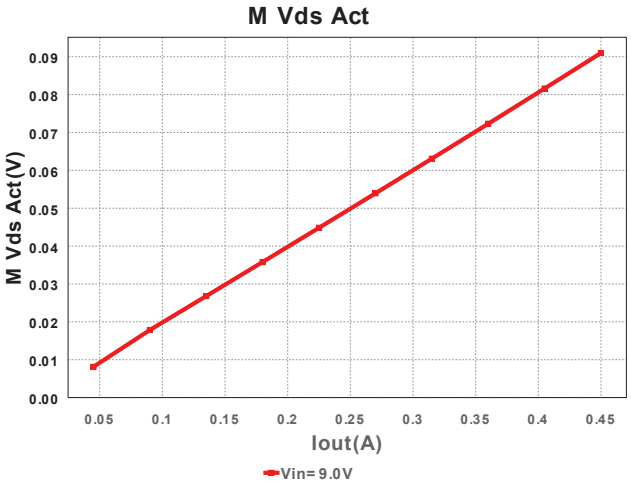


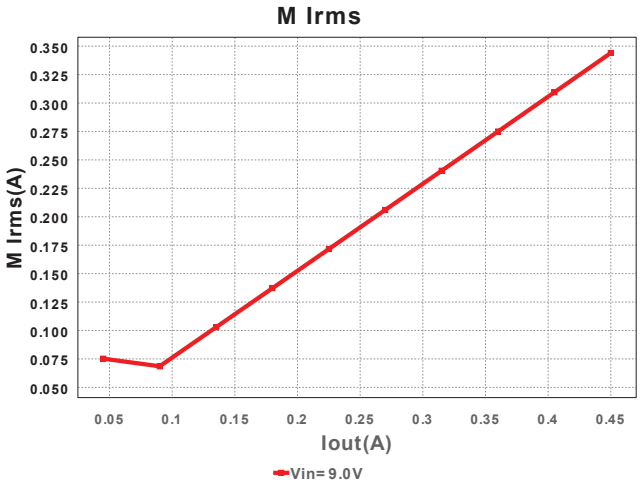


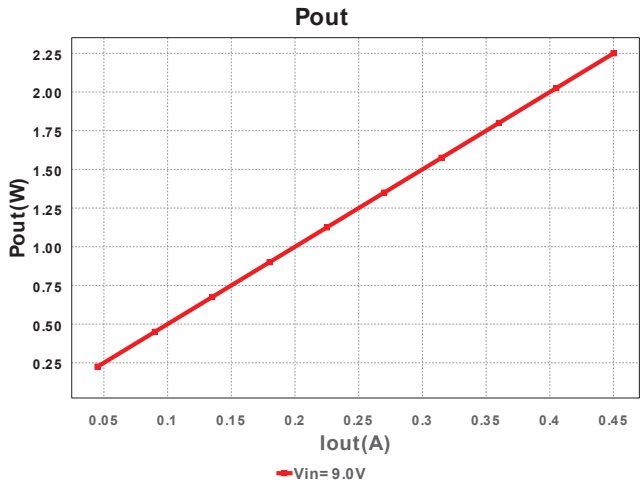


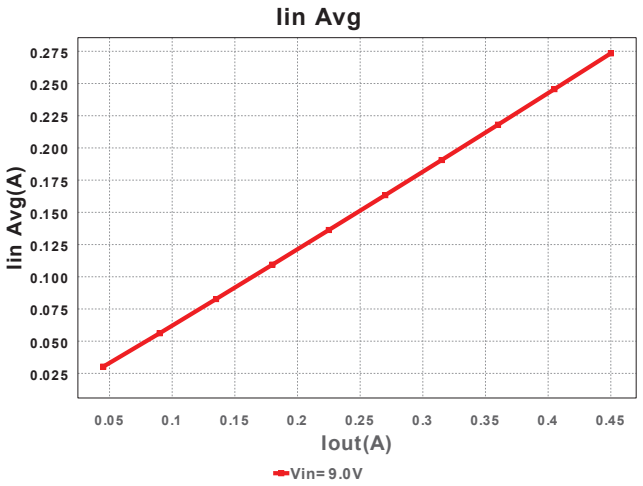


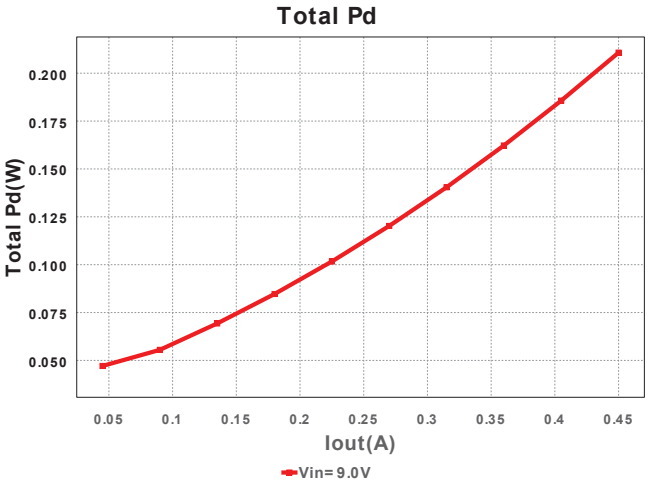


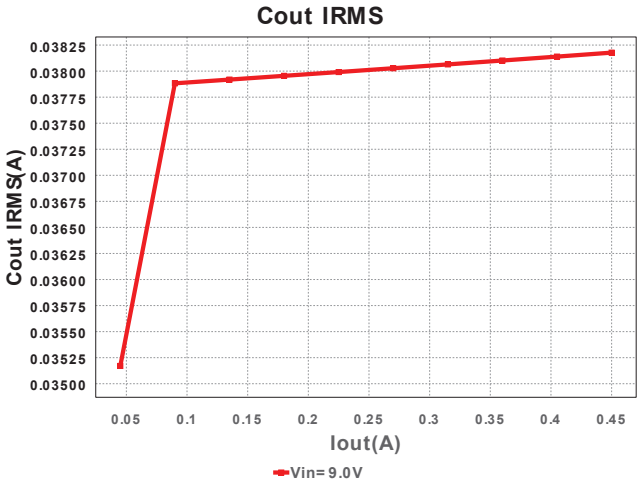


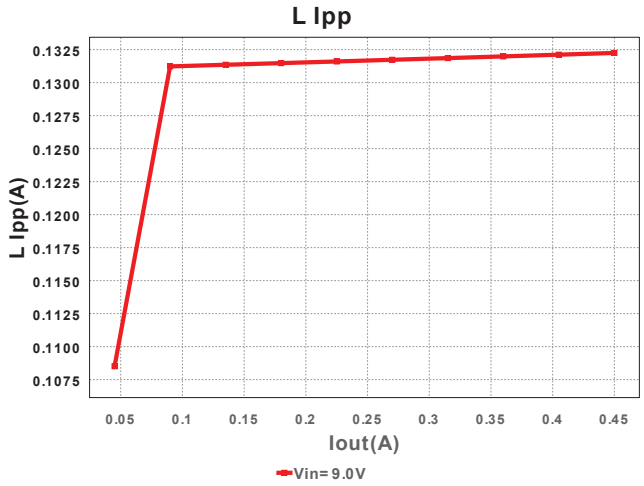


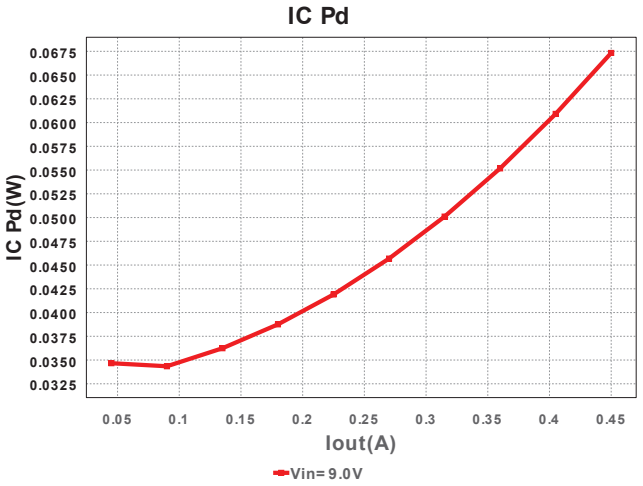


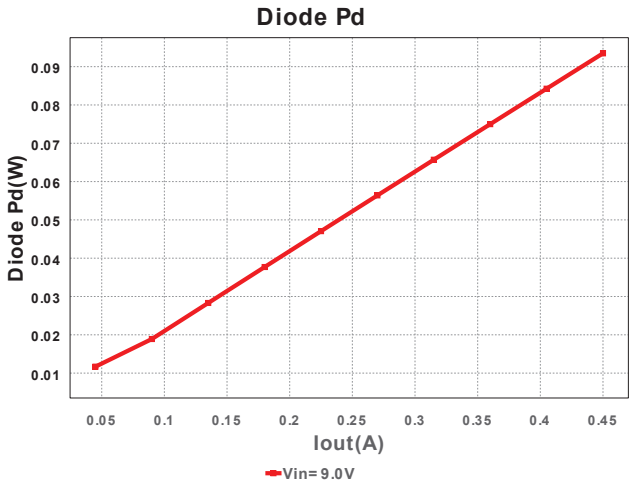












Operating Values

#	Name	Value	Category	Description
1.	BOM Count	7		Total Design BOM count
2.	Total BOM	$2.496		Total BOM Cost
3.	Cin IRMS	221.76 mA	Current	Input capacitor RMS ripple current
4.	Cout IRMS	38.177 mA	Current	Output capacitor RMS ripple current
5.	IC Ipk	516.125 mA	Current	Peak switch current in IC
6.	Iin Avg	273.42 mA	Current	Average input current
7.	L Ipp	132.25 mA	Current	Peak-to-peak inductor ripple current
8.	M1 Irms	344.05 mA	Current	Q Iavg
9.	FootPrint	335.0 mm2	General	Total Foot Print Area of BOM components
10.	Frequency	260.0 kHz	General	Switching frequency
11.	IC Tolerance	0.0 V	General	IC Feedback Tolerance
12.	M Vds Act	90.996 mV	General	Voltage drop across the MosFET
13.	Pout	2.25 W	General	Total output power
14.	D1 Tj	53.369 degC	Op_Point	D1 junction temperature
15.	Vout OP	5.0 V	Op_Point	Operational Output Voltage
16.	Cross Freq	61.205 kHz	Op_point	Bode plot crossover frequency
17.	Duty Cycle	58.455 %	Op_point	Duty cycle
18.	Efficiency	91.436 %	Op_point	Steady state efficiency
19.	IC Tj	37.07 degC	Op_point	IC junction temperature
20.	ICThetaJA	105.0 degC/W	Op_point	IC junction-to-ambient thermal resistance
21.	IOUT_OP	450.0 mA	Op_point	Iout operating point
22.	Phase Marg	56.122 deg	Op_point	Bode Plot Phase Margin
23.	VIN_OP	9.0 V	Op_point	Vin operating point
24.	Vout p-p	26.607 mV	Op_point	Peak-to-peak output ripple voltage
25.	Cin Pd	639.308 µW	Power	Input capacitor power dissipation
26.	Cout Pd	291.502 µW	Power	Output capacitor power dissipation
27.	Diode Pd	93.477 mW	Power	Diode power dissipation
28.	IC Pd	67.33 mW	Power	IC power dissipation
29.	L Pd	49.005 mW	Power	Inductor power dissipation
30.	Total Pd	210.741 mW	Power	Total Power Dissipation

Design Inputs

#	Name	Value	Description
1.	Iout	450.0 mA	Maximum Output Current
2.	Iout1	450.0 mAmps	Output Current #1
3.	VinMax	9.0 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	LM2675	Base Product Number
8.	source	DC	Input Source Type
9.	Ta	30.0 degC	Ambient temperature

Design Assistance

1. **LM2675** Product Folder : http://www.ti.com/product/lm2675 : contains the data sheet and other resources.