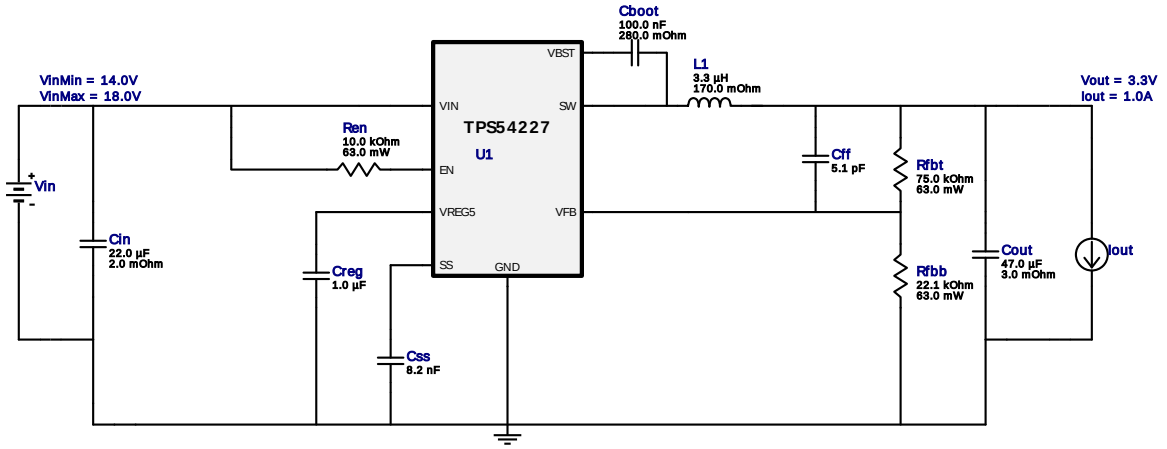
WEBENCH® 设计报告

VinMin = 14.0V
VinMax = 18.0V
Vout = 3.3V
Iout = 1.0A

Device = TPS54227DDAR
Topology = Buck
创建 = 5/30/13 5:56:06 PM
BOM成本 = $1.93
Total Pd = 0.52W
大小 = 181.0mm2
BOM 数量 = 11

Design : 3715830/14 TPS54227DDAR
TPS54227DDAR 14.0V-18.0V to 3.3V @ 1.0A



电气材料清单

#	名称	制造商	零件编号	属性	Qty	Price	大小
1.	Cboot	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
2.	Cff	MuRata	GRM1555C1E5R1CA01D Series= C0G/NP0	Cap= 5.1 pF VDC= 25.0 V IRMS= 0.0 A	1	$0.01	0402 8mm2
3.	Cin	MuRata	GRM32ER61E226KE15L Series= X5R	Cap= 22.0 µF ESR= 2.0 mOhm VDC= 25.0 V IRMS= 3.67 A	1	$0.31	1210 23mm2
4.	Cout	MuRata	GRM31CR60J476ME19L Series= X5R	Cap= 47.0 µF ESR= 3.0 mOhm VDC= 6.3 V IRMS= 0.0 A	1	$0.20	1206 19mm2
5.	Creg	MuRata	GRM155R61A105KE15D Series= X5R	Cap= 1.0 µF VDC= 10.0 V IRMS= 0.0 A	1	$0.01	0402 8mm2
6.	Css	MuRata	GRM155R71E822KA01D Series= X7R	Cap= 8.2 nF VDC= 25.0 V IRMS= 0.0 A	1	$0.01	0402 8mm2
7.	L1	Coilcraft	ME3215-332MLB	L= 3.3 µH DCR= 170.0 mOhm	1	$0.25	ME3215 23mm2
8.	Ren	Vishay-Dale	CRCW040210K0FKED Series= CRCW..e3	Res= 10.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 8mm2
9.	Rfbb	Vishay-Dale	CRCW040222K1FKED Series= CRCW..e3	Res= 22.1 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 8mm2
10.	Rfbt	Vishay-Dale	CRCW040275K0FKED Series= CRCW..e3	Res= 75.0 kOhm Power= 63.0 mW Tolerance= 1.0%	1	$0.01	0402 8mm2

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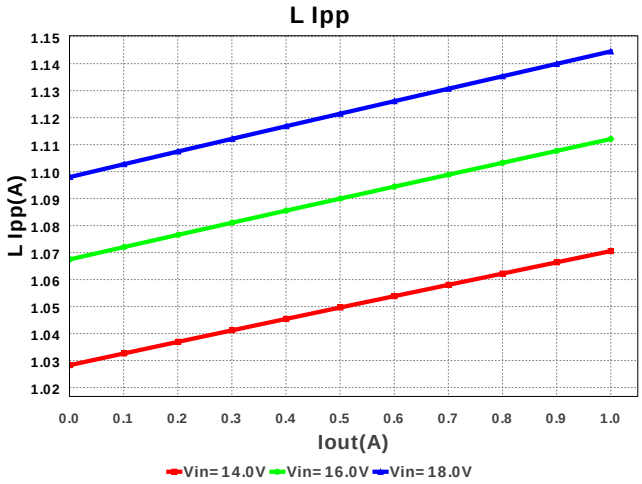
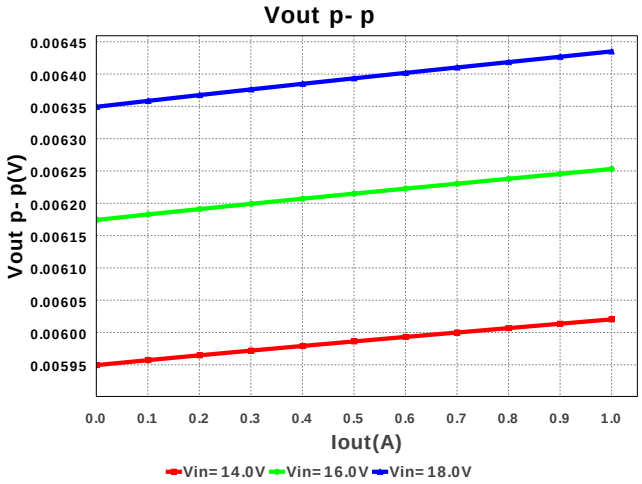
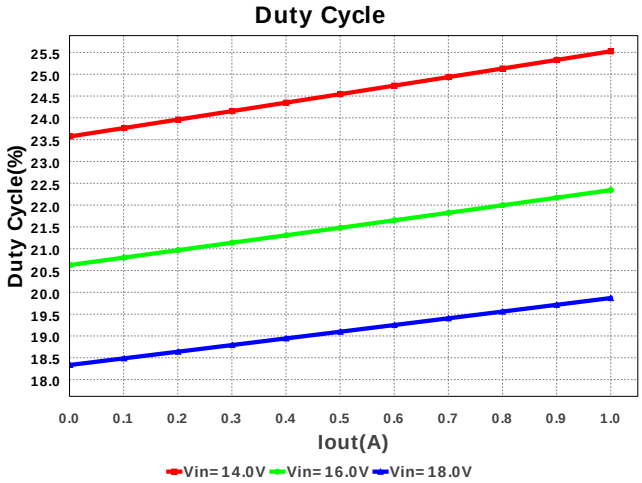
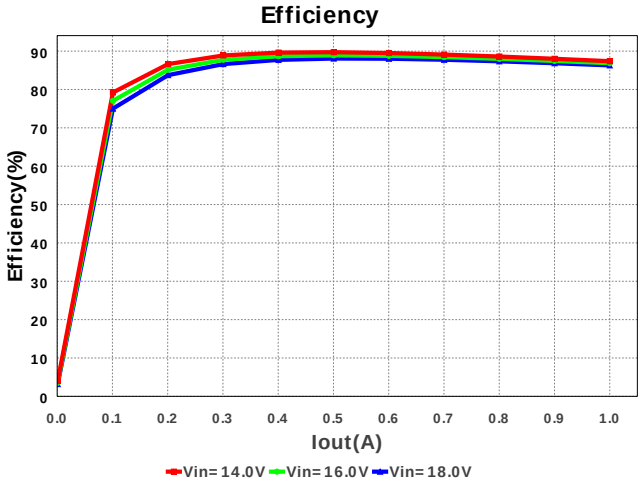
#	名称	制造商	零件编号	属性	Qty	Price	大小
11.	U1	Texas Instruments	TPS54227DDAR	Switcher	1	$1.10	

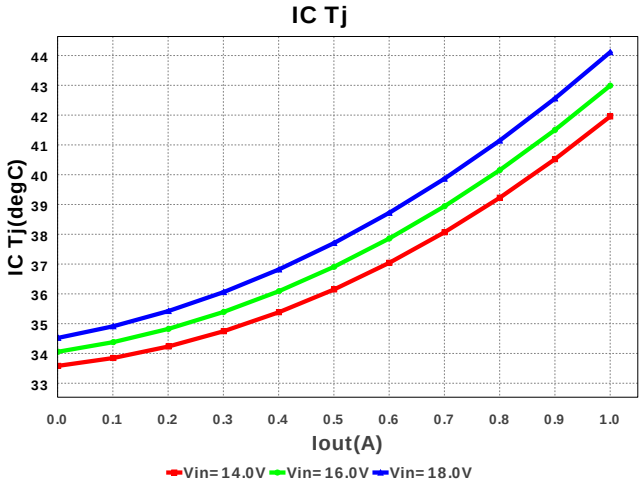
R-PDSO-G8 57mm2

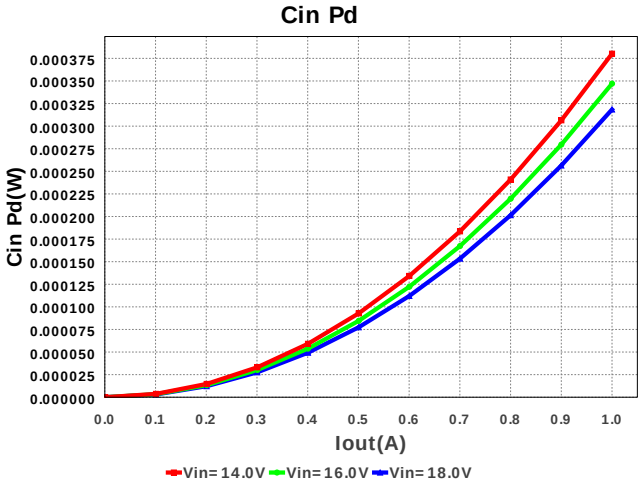












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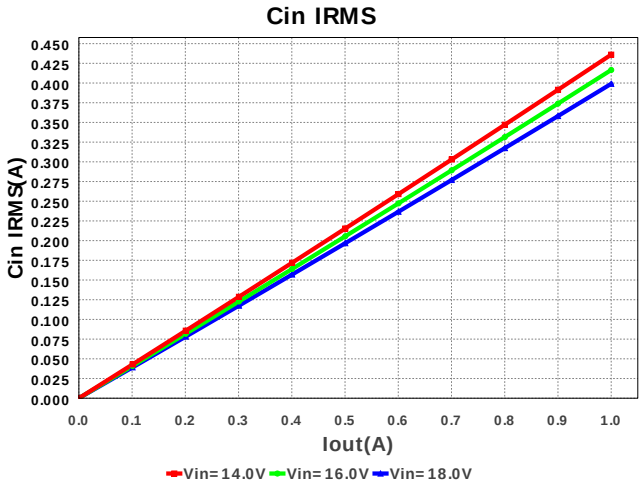
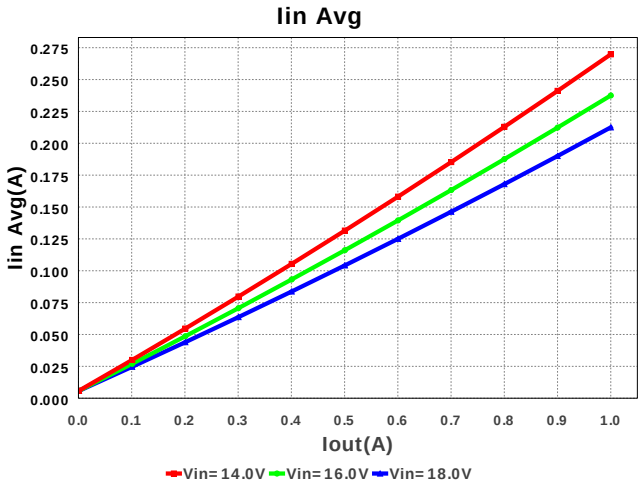
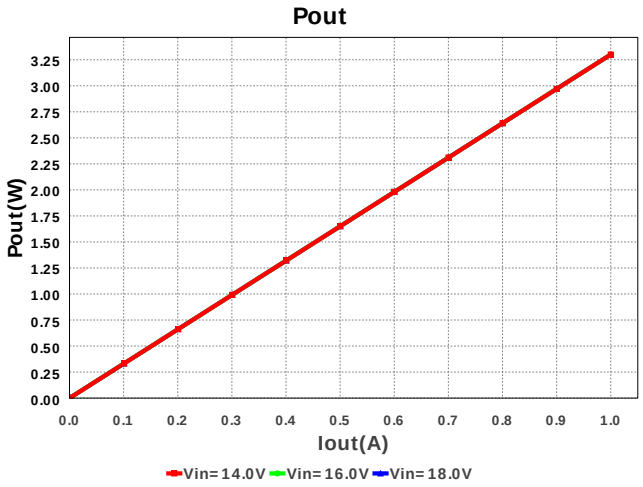
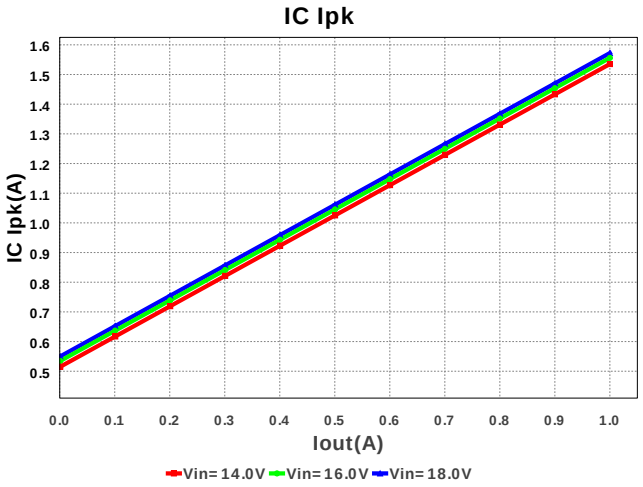
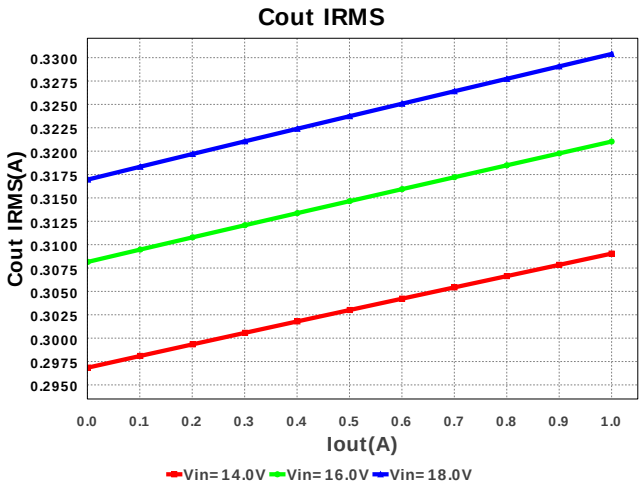
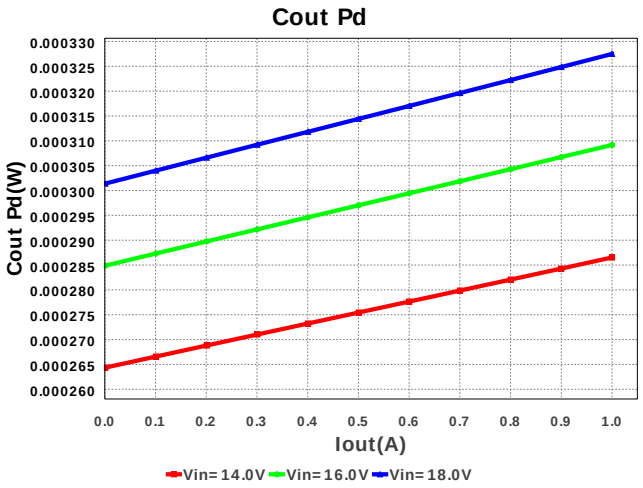

Cin IRMS
Cin IRMS(A)
0.450
0.425
0.400
0.375
0.350
0.325
0.300
0.275
0.250
0.225
0.200
0.175
0.150
0.125
0.100
0.075
0.050
0.025
0.000
0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Iout(A)
Vin=14.0V Vin=16.0V Vin=18.0V

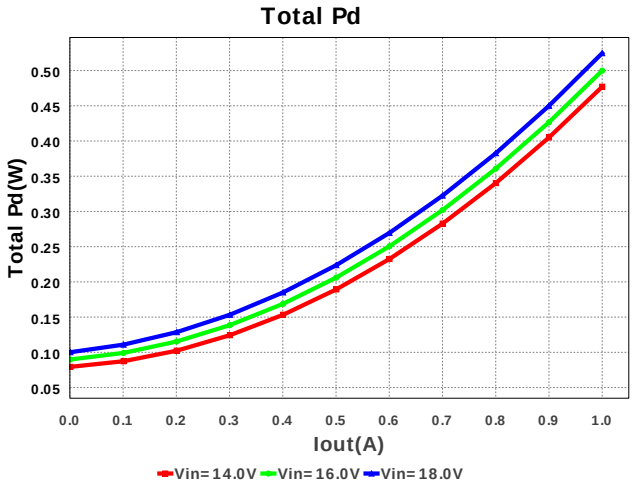

Iin Avg
Iin Avg(A)
0.275
0.250
0.225
0.200
0.175
0.150
0.125
0.100
0.075
0.050
0.025
0.000
0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Iout(A)
Vin=14.0V Vin=16.0V Vin=18.0V

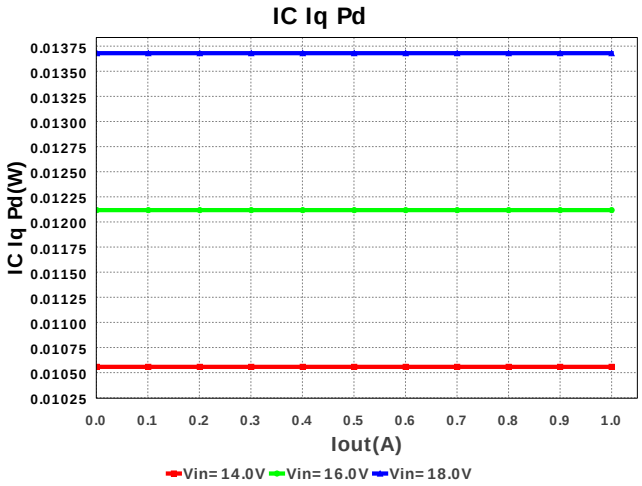

Pout
Pout(W)
3.25
3.00
2.75
2.50
2.25
2.00
1.75
1.50
1.25
1.00
0.75
0.50
0.25
0.00
0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Iout(A)
Vin=14.0V Vin=16.0V Vin=18.0V

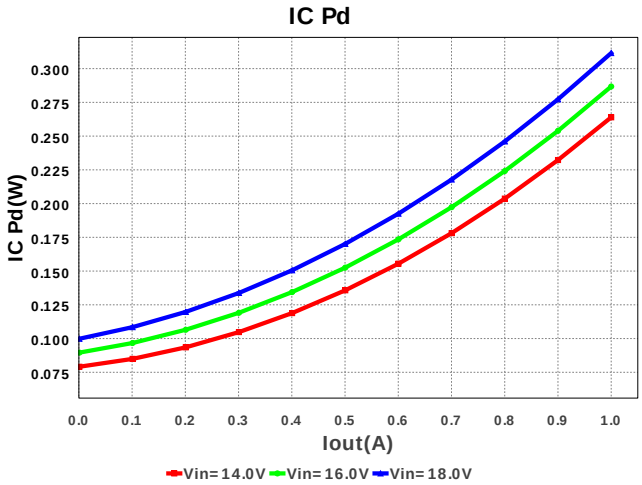

IC Ipk
IC Ipk(A)
1.6
1.5
1.4
1.3
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Iout(A)
Vin=14.0V Vin=16.0V Vin=18.0V

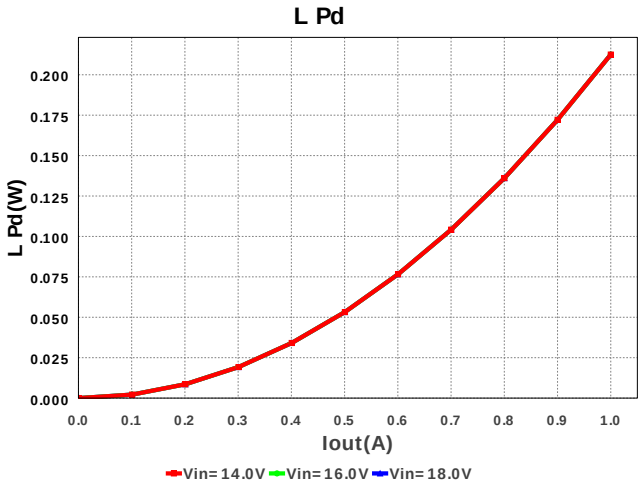

Cout IRMS
Cout IRMS(A)
0.3300
0.3275
0.3250
0.3225
0.3200
0.3175
0.3150
0.3125
0.3100
0.3075
0.3050
0.3025
0.3000
0.2975
0.2950
0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Iout(A)
Vin=14.0V Vin=16.0V Vin=18.0V


Cout Pd
Cout Pd(W)
0.000330
0.000325
0.000320
0.000315
0.000310
0.000305
0.000300
0.000295
0.000290
0.000285
0.000280
0.000275
0.000270
0.000265
0.000260
0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
Iout(A)
Vin=14.0V Vin=16.0V Vin=18.0V









工作数值

#	名称	数值	类别	说明
1.	Cin IRMS	399.017 mA	Current	输入电容器均方根纹波电流
2.	Cout IRMS	330.397 mA	Current	输出电容器均方根纹波电流
3.	IC Ipk	1.572 A	Current	电路内的峰值开关电流
4.	Iin Avg	212.48 mA	Current	平均输入电流
5.	L Ipp	1.145 A	Current	峰值到峰值电感器纹波电流
6.	BOM 数量	11	General	Total Design BOM count
7.	大小	181.0 mm2	General	BOM组件的总所占面积
8.	频率	773.324 kHz	General	开关频率
9.	模式	CCM	General	传导模式
10.	Pout	3.3 W	General	总输出功率
11.	总 BOM	$1.93	General	Total BOM Cost
12.	Vout OP	3.3 V	Op_Point	Operational Output Voltage
13.	占空比	19.869 %	Op_point	占空比
14.	效率	86.282 %	Op_point	稳态效率
15.	IC Tj	44.112 degC	Op_point	电路接点温度
16.	ICThetaJA	45.3 degC/W	Op_point	电路接点到环境热敏电阻
17.	IOUT_OP	1.0 A	Op_point	Iout 操作点
18.	VIN_OP	18.0 V	Op_point	Vin操作点
19.	Vout p-p	6.435 mV	Op_point	峰值到峰值输出纹波电压
20.	Cin Pd	318.429 µW	Power	输入电容器功率耗散
21.	Cout Pd	327.486 µW	Power	输出电容器功率耗散
22.	电路静态电流功率耗散	13.68 mW	Power	电路静态电流功率耗散
23.	IC Pd	311.529 mW	Power	电路功率耗散
24.	L Pd	212.5 mW	Power	电感器功率耗散
25.	整体 Pd	524.664 mW	Power	总功率耗散

设计输入

#	名称	数值	说明
1.	输出电流	1.0 A	最大输出电流
2.	Iout1	1.0 Amps	Output Current #1

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#	名称	数值	说明
3.	Vin 最大	18.0 V	最高输入电压
4.	Vin 最小	14.0 V	最低输入电压
5.	输出电压:	3.3 V	输出电压
6.	Vout1	3.3 Volt	Output Voltage #1
7.	base_pn	TPS54227	美国国家半导体的产品编号
8.	源	DC	输入源类别
9.	工作环境温度	30.0 degC	环境温度

设计协助

1. TPS54227 Product Folder : http://www.ti.com/product/tps54227 : contains the data sheet and other resources.

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