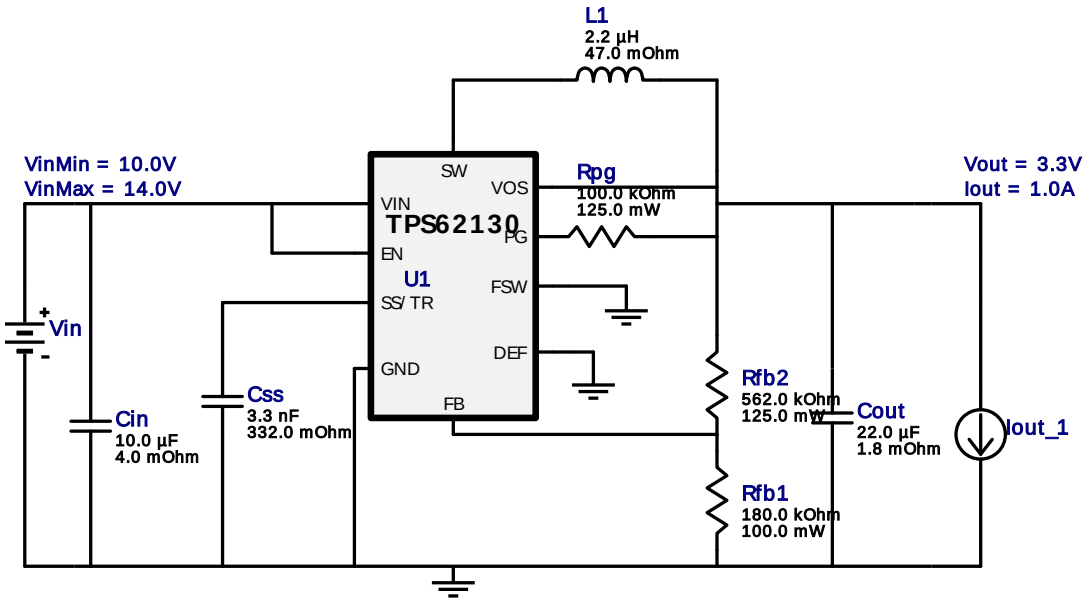
WEBENCH® 设计报告

VinMin = 10.0V
VinMax = 14.0V
Vout = 3.3V
Iout = 1.0A

Device = TPS62130RGTR
Topology = Buck
创建 = 5/13/13 12:25:07 AM
BOM成本 = $1.64
Total Pd = 0.46W
大小 = 159.0mm2
BOM 数量 = 8

Design : 3456113/7 TPS62130RGTR
TPS62130RGTR 10.0V-14.0V 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.	Cin	MuRata	GRM31CR61E106KA12L Series= X5R	Cap= 10.0 µF ESR= 4.0 mOhm VDC= 25.0 V IRMS= 0.0 A	1	$0.07	1206 19mm2
2.	Cout	TDK	C2012X5R0J226M Series= X5R	Cap= 22.0 µF ESR= 1.8 mOhm VDC= 6.3 V IRMS= 0.0 A	1	$0.06	0805 13mm2
3.	Css	Kemet	C0805C332K5RACTU Series= X7R	Cap= 3.3 nF ESR= 332.0 mOhm VDC= 50.0 V IRMS= 319.0 mA	1	$0.01	0805 13mm2
4.	L1	Bourns	SDR0403-2R2ML	L= 2.2 µH DCR= 47.0 mOhm	1	$0.17	SDR0403 39mm2
5.	Rfb1	Susumu Co Ltd	RR1220P-184-D Series= 264	Res= 180.0 kOhm Power= 100.0 mW Tolerance= 0.5%	1	$0.01	0805 13mm2
6.	Rfb2	Vishay-Dale	CRCW0805562KFKEA Series= CRCW..e3	Res= 562.0 kOhm Power= 125.0 mW Tolerance= 1.0%	1	$0.01	0805 13mm2
7.	Rpg	Vishay-Dale	CRCW0805100KFKEA Series= CRCW..e3	Res= 100.0 kOhm Power= 125.0 mW Tolerance= 1.0%	1	$0.01	0805 13mm2
8.	U1	Texas Instruments	TPS62130RGTR	Switcher	1	$1.30	S-PVQFN-N16 36mm2

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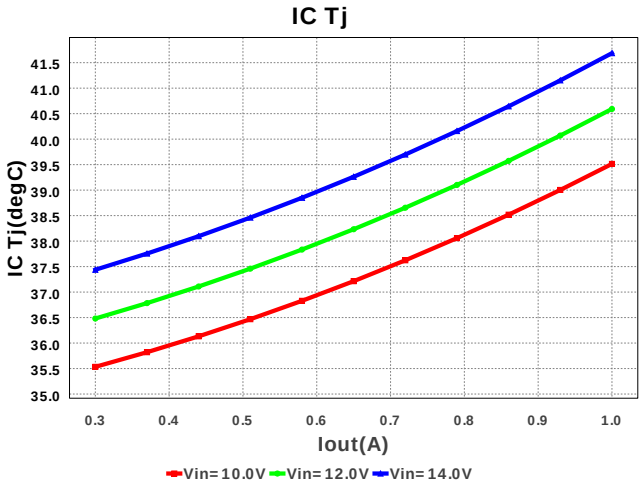
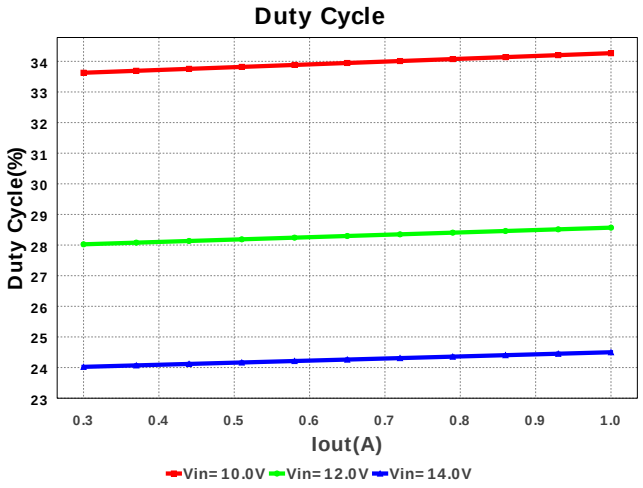
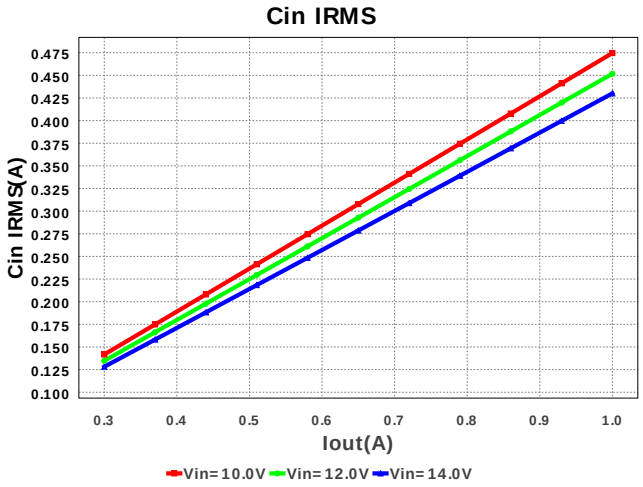
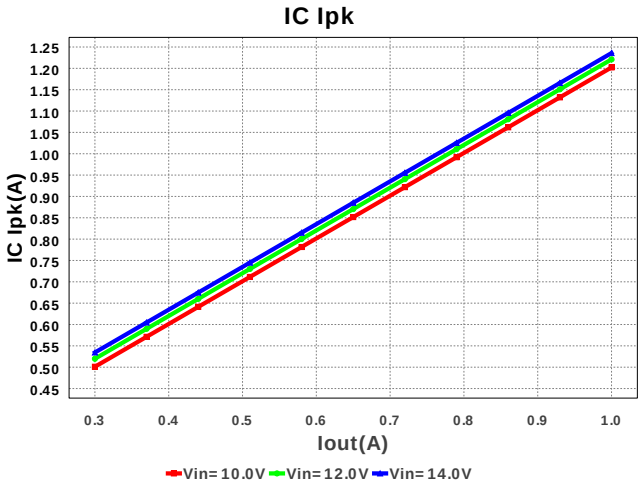
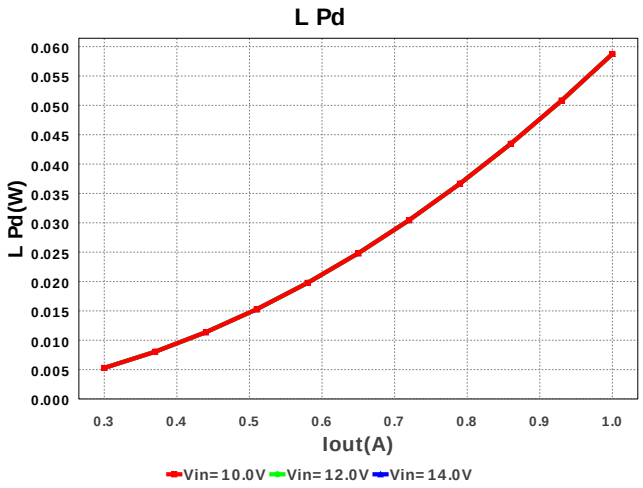
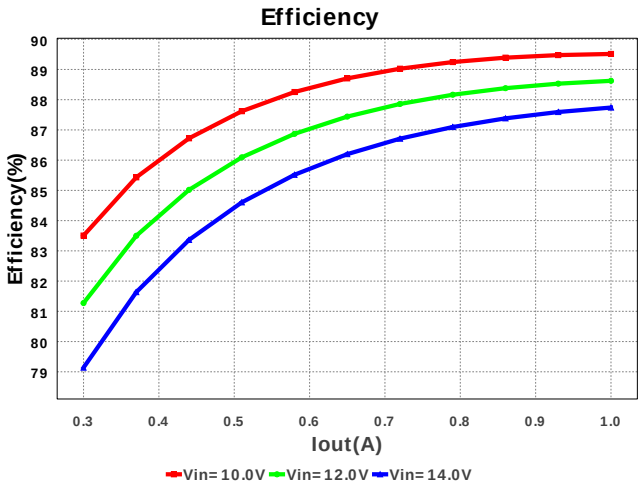

IC Tj
IC Tj(degC)
41.5
41.0
40.5
40.0
39.5
39.0
38.5
38.0
37.5
37.0
36.5
36.0
35.5
35.0
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Iout(A)
Vin=10.0V
Vin=12.0V
Vin=14.0V

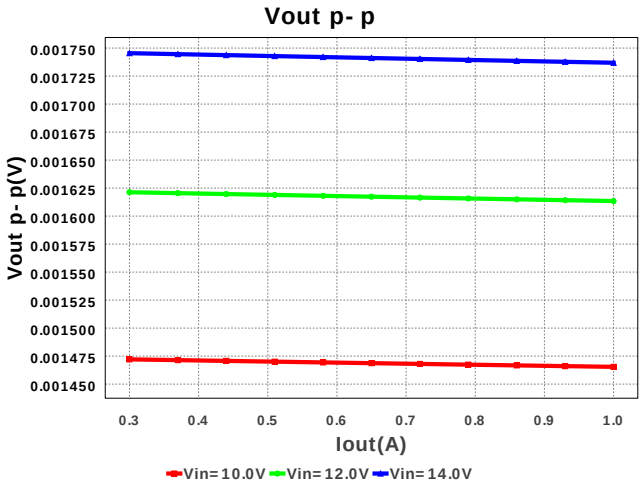

Duty Cycle
Duty Cycle(%)
34
33
32
31
30
29
28
27
26
25
24
23
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Iout(A)
Vin=10.0V
Vin=12.0V
Vin=14.0V

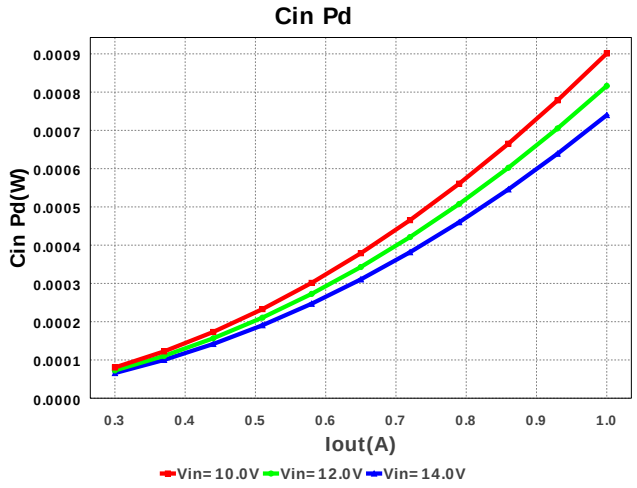

Cin IRMS
Cin IRMS(A)
0.475
0.450
0.425
0.400
0.375
0.350
0.325
0.300
0.275
0.250
0.225
0.200
0.175
0.150
0.125
0.100
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Iout(A)
Vin=10.0V
Vin=12.0V
Vin=14.0V

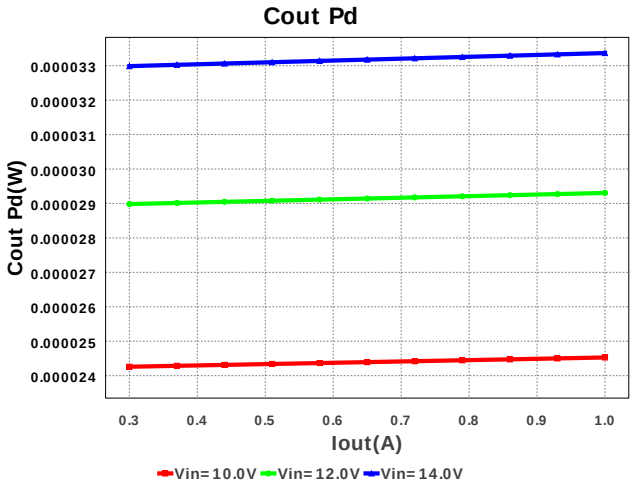

IC Ipk
IC Ipk(A)
1.25
1.20
1.15
1.10
1.05
1.00
0.95
0.90
0.85
0.80
0.75
0.70
0.65
0.60
0.55
0.50
0.45
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Iout(A)
Vin=10.0V
Vin=12.0V
Vin=14.0V

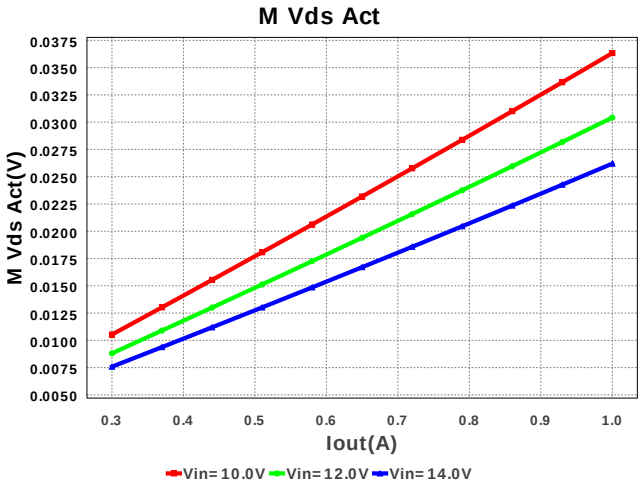

L Pd
L Pd(W)
0.060
0.055
0.050
0.045
0.040
0.035
0.030
0.025
0.020
0.015
0.010
0.005
0.000
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Iout(A)
Vin=10.0V
Vin=12.0V
Vin=14.0V

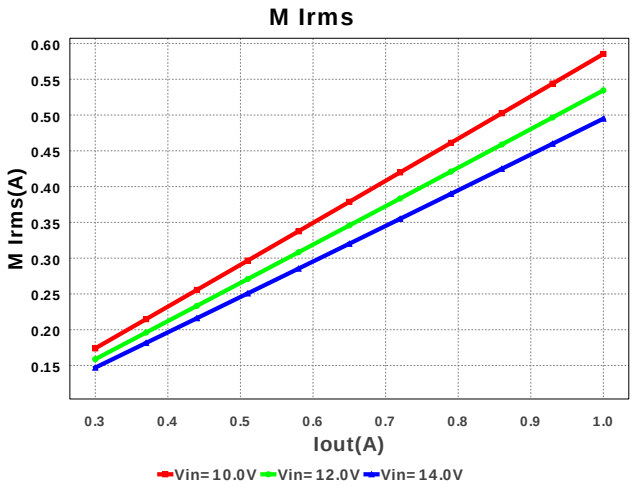

Efficiency
Efficiency(%)
90
89
88
87
86
85
84
83
82
81
80
79
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Iout(A)
Vin=10.0V
Vin=12.0V
Vin=14.0V

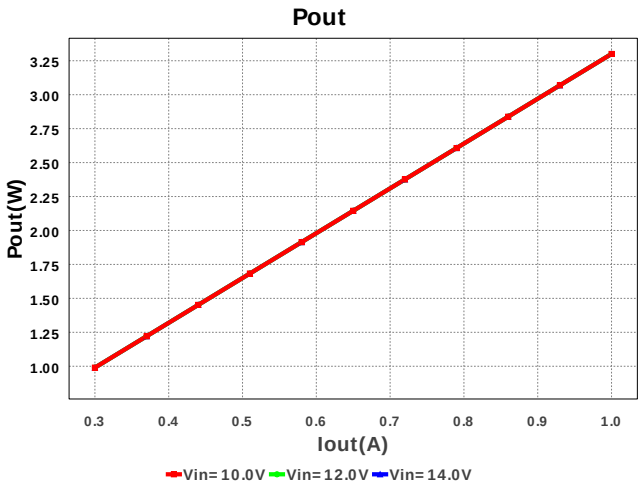












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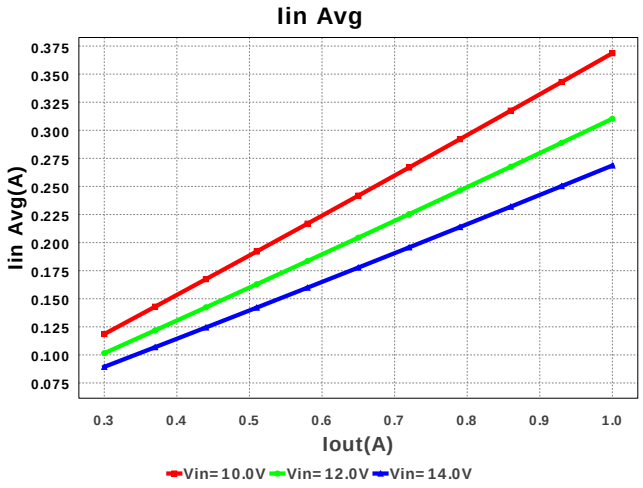

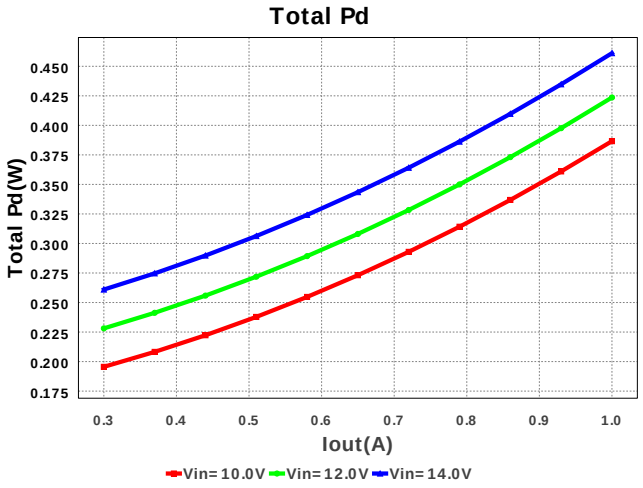

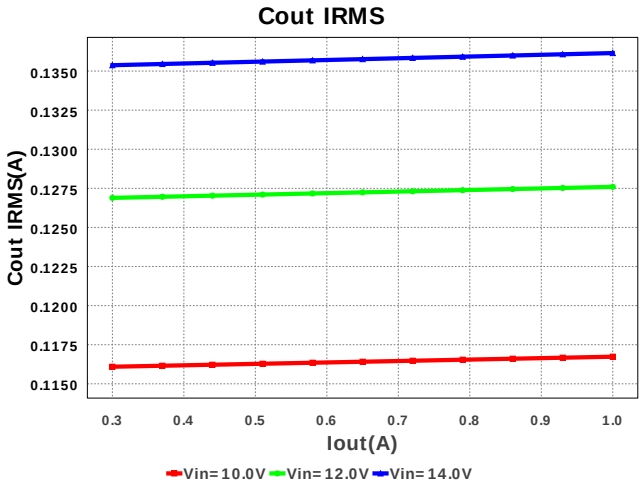

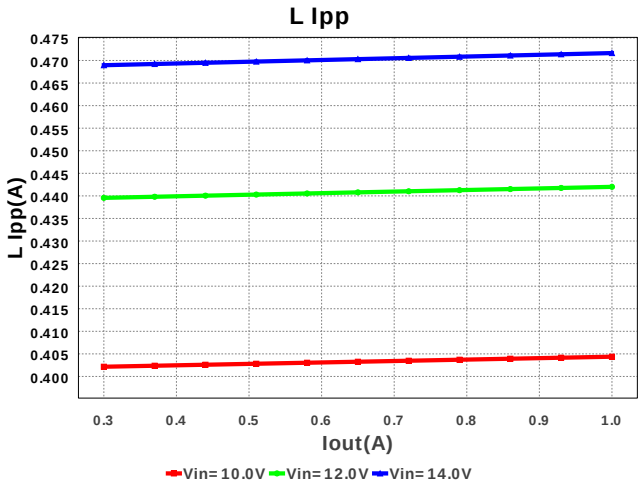

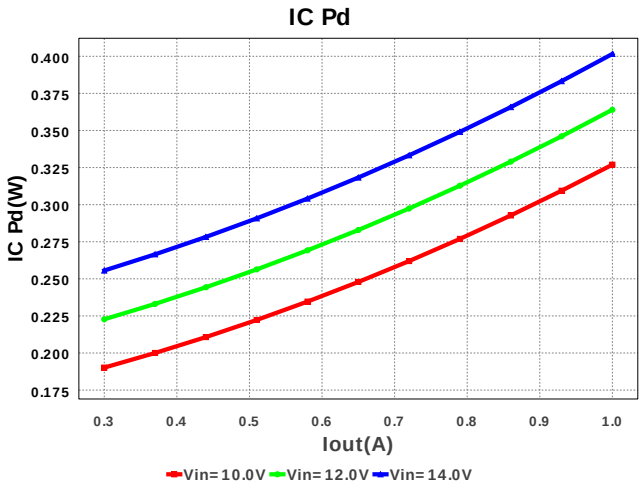

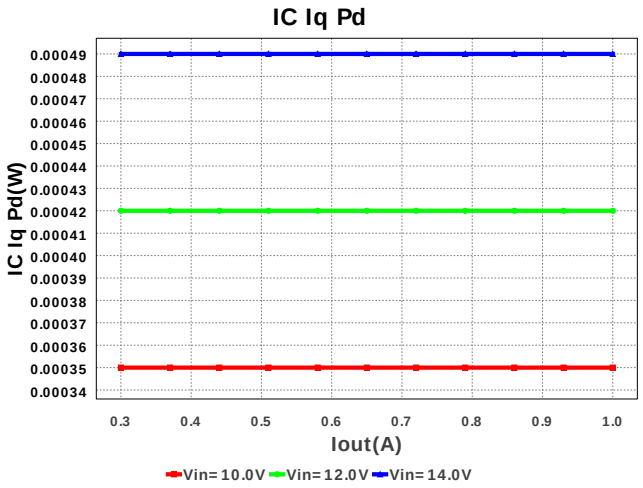

工作数值

#	名称	数值	类别	说明
1.	Cin IRMS	430.085 mA	Current	输入电容器均方根纹波电流
2.	Cout IRMS	136.151 mA	Current	输出电容器均方根纹波电流
3.	IC Ipk	1.236 A	Current	电路内的峰值开关电流
4.	Iin Avg	268.65 mA	Current	平均输入电流
5.	L Ipp	471.642 mA	Current	峰值到峰值电感器纹波电流
6.	M1 Irms	494.972 mA	Current	Q Iavg
7.	BOM 数量	8	General	Total Design BOM count
8.	大小	159.0 mm2	General	BOM组件的总所占面积
9.	频率	2.526 MHz	General	开关频率
10.	IC Tolerance	59.4 mV	General	IC Feedback Tolerance
11.	M Vds Act	26.2 mV	General	Voltage drop across the MosFET

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#	名称	数值	类别	说明
12.	模式	CCM	General	传导模式
13.	Pout	3.3 W	General	总输出功率
14.	总 BOM	$1.64	General	Total BOM Cost
15.	Vout OP	3.3 V	Op_Point	Operational Output Voltage
16.	占空比	24.5 %	Op_point	占空比
17.	效率	87.74 %	Op_point	稳态效率
18.	IC Tj	41.686 degC	Op_point	电路接点温度
19.	ICThetaJA	29.1 degC/W	Op_point	电路接点到环境热敏电阻
20.	IOUT_OP	1.0 A	Op_point	Iout 操作点
21.	VIN_OP	14.0 V	Op_point	Vin操作点
22.	Vout p-p	1.737 mV	Op_point	峰值到峰值输出纹波电压
23.	Cin Pd	739.894 µW	Power	输入电容器功率耗散
24.	Cout Pd	33.367 µW	Power	输出电容器功率耗散
25.	IC Pd	401.582 mW	Power	电路功率耗散
26.	L Pd	58.75 mW	Power	电感器功率耗散
27.	整体 Pd	461.111 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
3.	SoftStart	1.65 ms	软启动时间 (ms)
4.	Vin 最大	14.0 V	最高输入电压
5.	Vin 最小	10.0 V	最低输入电压
6.	输出电压:	3.3 V	输出电压
7.	Vout1	3.3 Volt	Output Voltage #1
8.	base_pn	TPS62130	美国国家半导体的产品编号
9.	源	DC	输入源类别
10.	工作环境温度	30.0 degC	环境温度

设计协助

1. Feature Highlights: DCS-Control(TM) Architecture with upto 3A output current, 3V to 17V Input Voltage Range, Adjustable output voltage from 0.9V to 6VSelectable operating frequency, Optional Softstart Capacitor for slow startup, Tracking,Pin selectable output voltage (nominal, +5%) Seamless Power Save Mode for Light Load Efficiency, Power Good Output, 100% Duty Cycle mode, Short Circuit Protection, Thermal Shutdown

2. TPS62130 Product Folder : http://www.ti.com/product/tps62130 : contains the data sheet and other resources.

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